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Transactions and Collections

To the End of the Year 1700,

A B R I D G ' D

AND

Dispos'd under GENERAL HEADS.

VOL. III. In Two PARTS.

The First Containing all the

Anatomical, Medical and Chymical,

And the Second all the

Philological and Miscellaneous Papers.

By JOHN LOWTHORP, M. A. and F. R. S.

The Third Edition.

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To the Right Honourable

ROBERT HARLEY, Esq;

ONE OF

Her Majesty's

Principal Secretaries of State, &c.

THESE

Medical and Philological Papers

A B R I D G ' D

AND

Dispos'd under GENERAL HEADS,

Are Most Humbly

Dedicated, by

JOHN LOWTHORP.



T H E
 Anatomical, Medical, and Chymical Papers,
 PUBLISH'D and DISPERS'D
 IN THE
 Philosophical Transactions
 A N D
 COLLECTIONS
 A B R I D G ' D,
 A N D
 Dispos'd under GENERAL HEADS.

C H A P. I.

Anatomy. Physick.

*The Structure, External Parts, and common
 Teguments, of Humane Bodies.*

I. **E**dmund Melloon (Born at Port Leiceſter in Ireland, and ſhewn See Irish Man of
an Extraordinary
Size; by Dr. Plot.
n. 240. p. 184.
1698.
 at Oxford 1684. being then 19 Years Old) was 7 Foot
 6 Inches high; his Finger 6 $\frac{1}{4}$ Inches long, the length of
 his Span 14 Inches, of his Cubit 2 Foot 2 Inches, of his
 Arm 3 Foot 2 $\frac{1}{2}$ Inches, from the Shoulder to the Crown of his Head
 1 $\frac{1}{2}$ Inches.
 Vol. III.

By Dr. Molyneux. n. 261. p. 502.

2. In the Year 1682, I saw and measur'd *Edmund Malone* at *Dublin*; His Father, though a proper Man, no way remarkable for his Height, but his Mother was of a more than ordinary low Stature: When he stood on the bare Ground with his Shoes off, he measured full 7 Foot 7 Inches in height; that is, about 2 Foot taller than a Man of a common Size.

A Prodigious Os Frontis; by Dr. Tho. Molyneux. n. 168 p. 88o. 1685.

II. 1. I have measured a Prodigious large *Os Frontis*, which is reserv'd in the *Medicine School* at *Leyden*. It is entire, and differs in no Respects from that of a Man, but in its Largeness; and since there's no Creature, especially of the larger Sort, that has this Bone at all resembling ours; there's not the least Question to be made, but this formerly belong'd to a Man, and that of a most extravagant Size. From its Juncture with the Nasal Bones, to the Place where the *Sutura Sagittalis* terminated, the Convex way, 'twas 9 Inches $\frac{1}{2}$; transversly from side to side, still measuring the Convex way, 'twas 12 Inches $\frac{1}{2}$; in thickness about $\frac{1}{2}$ Inch. I find ordinary Skulls scarce answer it in half Proportion; being one with another about $4\frac{1}{2}$ Inches long, 6 broad, and $\frac{1}{4}$ thick. So that supposing this Bone bore the same Proportion to his Stature, which the same in other Men does to theirs, the Man to whom this Bone belong'd must have been 11 or 12 Foot high. Dr. *Drelincourt*, the present Professor of *Anatomy*, told me, That he found it there when he first came into that Place, but never could learn who gave it, where it was found, or whence it came.

That there are some whose Heads are very large in proportion to their Bodies cannot be deny'd; yet generally such Skulls want in thickness, (as this does not,) are ill shaped, and not proportionable; and moreover, I am persuaded there never yet was an Instance of any Head, which by a præternatural Growth, came the least nigh this for Bulk.

Giants; by Dr. Tho. Molyneux. n. 261. p. 487. 1700.

2. I am not ignorant, that several Authors (as *Tho. Fazellus*, *Athanasius Kircher*, *Gaspar Schottus*, and others) both Ancient and Modern, have taken Pains to Register Accounts, not of Gigantick Bones only, but of entire Bodies of vastly Gigantick Men, found buried under Ground, or in the hollow Caverns of Mountains: But these Relations are commonly taken up by Hearsay only, and so ill attested, that they deserve but very little Credit. And tho' there is hardly any considerable Collection of Natural Curiosities, or a Printed Description of a *Museum*, extant, where some Part or other of a Giant is not to be met with, yet I am much of the same Opinion, as to most of these Gigantick Remains, with the Historian *Suetonius Tranquillus*, who says of *Augustus Cæsar*, that *Ædes suas non tam Statuarum Tabularumque pictarum Ornatu, quam Rebus vetustate ac Raritate notabilibus, excoluit; qualia sunt Capreis immanium Belluarum Fararumque Membra prægrandia, quæ dicuntur Gigantum Ossâ*. And certainly, most of pretended Giants Remains in our Days, such I mean as are truly Bone, (for some are only Natural Petrifications, and *Lapides sui Generis*, accidentally so figur'd as to resemble this or that Part of a Man) were Bones belonging to some of the biggest Quadrupeds, as Elephants, or some of the largest sort of Fishes of the Whale kind, called by *Pliny*, as well as *Suetonius*, *Belluæ* and *Belluæ Marinae*. And I am persuaded, that the large Tooth, mentioned by *Ol. Wormius*, and Figured by *Tho. Bartholine*, was nothing else than a Tooth of the *Cetus Dantatus*,

tus, or Sperma-Ceti-Whale. Nor is it long since, that the Bones of the Fore-fin of a Porpeps or a small Whale, artificially joyned together, were expos'd in *London* by way of publick Shew, as the Skeleton of a Giant's Hand: For all Fish of the *Cetaceus* or Whale-kind, have this Fin made up of just so many Ranges of Joynts, as naturally answer our 5 Fingers, and all together does not a little resemble a Man's Hand.

But the Prodigious large *Os Frontis* reserv'd in the *Medicine School* at *Leyden*, cannot be suspected to appertain to any other Creature than a Man: For this Bone in a Man, is of so peculiar a Make from the Globose shape of the Head, that there is not to be found a Bone among all the Animals of the Creation, that bears any Resemblance to its Figure, if we except that of a Monkey; but all this Genus being of a much smaller Size than a Man, gives us no Umbrage of Scruple. So that there is no Room to doubt of its being a true and genuine Part of a large Humane Animal; as will more clearly appear by comparing the neat Sketches drawn from the Bone itself by Mr. *Hugh Howard*, with a common *Os Frontis* of the ordinary Size in the following Figures; where

Figure 1, shews the common Shape and Size of the Fore-head Bone of a Man of an ordinary Stature, with its Convex or Out-side forward. *a b c d e*, The Line, the *Coronal Suture* makes with Indentures, elegantly exprest, going round the upper Edge of the Bone by which its joyned to both the *Ossa Bregmatis* or *Verticis*. *e*, The Place where the *Coronal* and *Sagittal* Sutures meet. *f*, The Part to which the Bones of the Nose are fastened. *g g*, The upper Part of the Orbits of the Eyes. *b b*, The Holes in the Bone over the Eyes, that give passage to the two large Branches of Nerves that supply the Frontal Muscle, and those of the Eye-brows. *i i*, The two Processes or Protuberances that joyn with the first Bone of the upper Jaw; these by some Accident were broken off the large Bone, and therefore are not exprest in the 2, *Fig.* The Measure round the Ambit of the *Coronal Suture* from *a* to *g*, was 10 Inches and $\frac{1}{4}$ of an Inch; In this Bone from *c*, where the *Coronal* and *Sagittal* Sutures meet, to *f*, where the Bones of the Nose are fastened, $4\frac{1}{2}$ Inches; from *b*, drawing a transverse Line cross the Forehead, to *d*, 6 Inches; the Thickness of the Bone was about $\frac{1}{4}$ of an Inch.

Fig. 1.

Figure 2, Represents the Gigantick Forehead Bone, exprest in the same Posture with the former, and drawn exactly to the same Proportion. *a b c d e*, The *Coronal Suture*, in some Places a little worn and defaced. *e*, The place where the *Coronal* and *Sagittal* Sutures meet. *f*, The Part where the Bones of the Nose were fastened. *g g*, The upper Part of the Orbits of the Eyes. *b b*, The two Holes for the Nerves that pass into the Muscles of the Eye-brows and the Frontal Muscle. The Measure round the Ambit of the *Coronal Suture* in this Bone from *a*, to *e*, was about 21 Inches; from *c*, where the *Sagittal* and *Coronal* Sutures meet, to *f*, where the Bones of the Nose are fastened, 9 Inches and one 10th of an Inch; *b*, from drawing a transverse Line across the Forehead to *d*, $12\frac{1}{4}$ Inches; the Thickness of the Bone, from one Table to t'other, about $\frac{1}{2}$ an Inch.

Fig. 2.

Fig. 3.

Figure 3. Shews the inside of the same *Gigantick Bone*, drawn likewise in the same Proportion. *k k*, The thickness of the Bone. *l*, The sharp and high Process of the *Os cribrosum*, called by Anatomists *Crista Galli*.

By comparing these Figures, 'tis evident, what an exact Conformity there is in all particulars between this large Bone and the like Bone in a Man of a just height; and that they no ways differ but in Magnitude. 'Tis also evident, that all the next immediately adjoining Bones, which near make up the entire Head, must necessarily have been as well shaped, and of the same Proportion with this Bone: otherwise they could not possibly cohere, so as to adapt themselves closely to one another, and make an entire Globose Skull. Whence it must follow, that the Man, to whom it belong'd, was more than twice the Height that Men usually are, according to the common Course of Nature; that is, more than 11 or 12 Foot high.

It cannot reasonably be supposed, that a Man of an ordinary Size could have had such an exceeding large Head; for I conceive, he could not possibly subsist, whilst so ponderous and excessive a Mass of Bone as this Skull, with all that super-abundant quantity of Brain requisite to fill its spacious Cavity, was growing: much less continue so long alive, as to come to Maturity of Years, or Adult and full Manhood; to which, we are sure, this Person must have attained, by the great Thickness and Solidity of this Bone, as well as its large Size. And tho' sometimes from Obstructions or other Morbifick Causes, our Glands and softer *Viscera* are so unequally nourished, as to grow to an immense Size, yet such a præternatural excess of Growth in a hard and Bony Part, I don't think, has ever yet been observed.

'Tis true Infants far gone in the *Rickets* are frequently observed to have great Heads in proportion to their small maciated Bodies, and that young Children are also liable to the *Hydrocephalus* or *Dropsy* in the Head, which sometimes so dilates it, as to swell their Skull to a more immense Size. But neither of these Disorders (for I take the Cause to be much the same in both Cases, only differing in Degree) otherwise affect the Head, than by a Præternatural Collection of serous Humors inclosed in the Brain, they extend the yielding Sides of the weak and tender Skull, but do not in the least increase its bony Substance; nay, on the contrary, they rather diminish it; for 'tis always observed, that they reduce it to a more than usual thinness, and sometimes, as I have seen myself, to be no thicker than an Egg-shell or Parchment. Nor can such Distempers possibly affect those of Adult Ages, so as to enlarge their Skulls; Because all the Bones by that Time are become solid and firmly knit together, so as to be no way capable of further Growth or Extension: And hence it is those Maladies are incident to Children, and them only, whilst their Skulls are soft, pliable, and truly Membranous, rather than Bony. And daily Experience assures us, that unless such Diseases be Timely removed, either by the Physician's or Chirurgion's Art, or overcome so early by the strength of Nature, as the Children have Time enough to grow out this Disproportion in their Heads, by the Bulk of their Body coming up to it, ere it arise to too exorbitant a Degree of

of Magnitude; they all die in their Infancy, and their unshapely Skulls are easily distinguish'd from all others, by the large Fontanell, or Open in the Mole of the Head, that remains Membranous, and never becomes, like the rest of the Skull, a Bony Substance. And that they cannot possibly arrive at Manhood is plain; for this Monstrous and unequal Growth, or rather swelling of their Heads, meeting with no Check, but still every Day increasing upon them, when it arrives to such a certain Degree, that its extravagant Dimensions become irreconcilable with the Natural Functions of the Body, the *Oeconomia Animalis* must inevitably sink under the Pressure of so great a Load, and the whole Machine tend to its Dissolution, as not being able to bear any longer with so highly Morbid a Disposition, in so principal, and so extremely necessary a Part to Life as the Brain, the Fountain of all Spirit, Sense, and Motion.

I shall not deny, but by one Accident or other, some Disproportion between the Head and the rest of the Body, in such as are grown up to the compleat Stature of Man, does sometimes happen. But a Disproportion of this kind, however remarkable to the Eye and unseemly, is never so extraordinary as to be very considerable in it'self. For I find the Circumference of a Man's Head of a moderate, that is the most common Size, is usually about 22 Inches, and if we chance to see one of 25 or 26 on a Man of Ordinary Height, which certainly is very rare, it appears large and remarkable; but should there be found a Head still bigger, so as to be 28 or 29 Inches in Ambit, (which I am apt to think, for the Reasons above mentioned, has scarce or ever happened, unless where the Proportion of the other Parts of the Body were such as necessarily required it) such a one I say, would be really wonderful, and counted Monstrous. Yet the Circumference of the Head, of which this large Fore-head Bone was a Part, so far exceeded the largest of these Measures, that, as I computed it's Dimensions, when 'twas entire and covered with the Hairy Scalp, it was about 44 Inches round; and therefore must have had a Body belonging to it, that bore a proper Conformity to this its spacious Circumference.

Nor do I apprehend so great a Stature as this in a Humane Body, tho' it be indeed extraordinary, any way absurd or repugnant to the Course of Nature; but rather, if duly weigh'd, very conformable to a certain anamalous Method, if I may so call it, that she apparently affects in the producing most of her Works. Thus we cannot but observe in the Vegetable Kingdom, that some are of the Dwarf-kind, while others arise to so stupendous a Growth, that they more than double the Bulk even of such as are esteem'd large in the same Tribe. Several Examples of such like Gigantick Oaks, and other sorts of exceeding vast Trees, may be seen Registred by Mr. Evelyn. And amongst Animals, if we compare that little low of Race Horses from the *Isle of Man*, usually call'd *Manks Horses*, to that large Breed they have in *Northamptonshire* in *England*, or in the *Bishoprick of Liege* in *Flanders*, we may properly enough esteem these in comparison with those, a sort of Gigantick Horses. Or, if the *Irish Wolf-Dog*, which is of the Grey-Hound kind, and of so beautiful and larke a Make, that for its curious Form, as well as goodly Size, it far surpasses all other Dogs of the Creation, be compared to

Sylvia c. 30.

a common Grey-Hound, it appears truly of a Gigantick Breed ; And we may further add concerning it. As the Giant's Stock of old is extinct, at least in these Countries, so this Gigantick Dog is now so rare, that in a few Generations more, I doubt not but 'twill be quite lost in these Parts, and the Species perish, for ought I know, off the Face of the Earth.

And that Nature takes the same uncertain Measures in the Generation of Mankind, I think, is not less apparent. Thus the *Laplanders* are a Nation remarkable for their low Stature ; and 'tis sure, there are and have been in all Ages and Countries those we call *Dwarfs*, and some of them of a most extraordinary small Size of Body. The Duke of *Crequi's* Famous Dwarf, as describ'd by *Aldrovandus*, was not in Height above 30 Inches ; and the same Author speaks of others still shorter. Now since Natural Causes operate so as to produce Humane Creatures, partaking of all Properties common to their Kind, of so small a Model as to fall short even of half the common Standard of their Species, I cannot think it unreasonable, supposing we had no other Authority for it, to imagine that the same Natural Causes may sometimes act in t'her Extream likewise.

There is a manifest Alliance and Congruity observable in Nature, between the Stature of Man's Body, and his Age during the Time of his Growth ; whence the *Greeks* thought it not improper to express both these by one and the same Word *ἡλικία*, which signifies promiscuously Stature as well as Age. And as $5\frac{1}{2}$ Feet may well be esteem'd the most settled and ordinary Degree of Height in a Man ; so about 70 Years may justly be allow'd the most common Period of his Age : yet daily Experience and Observation acquaint us with those that vastly exceed these Limits, in both these Respects : and as we have certain History that informs, That the Youngest of these, *Thomas Parr*, and *Henry Jenkins*, both of *England*, and the Old Countess of *Desmond*, and *Mrs. Eckleston*, both of *Ireland*, fully compleated double that usual Term of Life ; so we have no Reason to question the Accounts given us of others, that have been found in Stature double the common Standard of Man. Nay, both these Properties, Longevity and High Stature, do so naturally result each from their proper Causes, that they are so often observed to become hereditary, and run in whole Families ; whence the *Greeks* had their *μυαγεσβιοι*, and the *Romans* their *Celsi* ; and in *Palestine* of old, they had their *Anakims*, or Sons of the Giants. So that Humane Gigantick Bodies are no way Inconsistent with the Course of Nature. And indeed, we have some clear Testimonies given us by Authors of unquestionable Credit and Veracity, that there actually have been Men in the World, and likely still are, of so large a Bulk, and so high a Stature of Body, as properly to deserve the Name of Giants. *Edmund Malone*, when he stood on the bare Ground with his shoes off, measured full 7 Foot 7 Inches in Height ; *Walter Parsons*, King *James I's* Porter born in *Staffordshire*, was much of the same Stature. In *Flanders* and *Germany*, where Men are usually of a larger Size, and their Bodies of a grosser Make than with us, we meet with Examples that have been much taller. *Isbrand Diemberbroeck* tells us, he saw himself at *Utrecht*, in the Year 1665, a Man 8 Foot and a half high, all his Limbs well-shaped, and his Strength proportionable to his Height : He was Born at *Schoonhoven* in *Holland*, of Parents

Vid. Sup. Sect. 1.

Anat. c. 1. lib. 1.

Travails.

of

of an ordinary Stature; and Mr. Ray mentions, That he saw this very Man at Bruges in Flanders. Jo. Goropius Becanus says, he saw a Youth almost 9 Foot high, a Man near 10 Foot, and a Woman that was quite 10 Foot in Height. Pliny the Naturalist speaks of several Men in his Age, much of the same Height, or something Taller, than those mentioned by Becanus. And it is not improbable, that where both the Soil and Climate concur, and are Naturally disposed to produce Plants, Fruits, and several Kind of Animals, of a much larger Bulk than any our Countries afford, such as the Ostridges and Cunters among Birds: the largest Crocodiles, the Moose Deer, the Elephant, the Rhinoceros, the Hippopotamus, &c. among Quadrupeds; In those Parts of the World, I say, where such like vast Creatures are met with, 'tis not unlikely that human Animals may also be sometimes found of a much greater Size than any here among us. Thus Andreas Thevet, the Famous Voyager, tells us, That being himself on the Coast of Africk, in the Territory of Arguin, for 3 Weeks together, he chanced to meet with a Rich Spanish Merchant, who had some while before suffered Shipwrack there by a Storm, yet had luckily sav'd a Coffin, wherein he had carefully preserv'd the Skull and Bones of an American Giant, he had brought along with him from that Country; who was 11 Foot and 5 Inches in Height, and dy'd in the Year 1559. These Bones he shewed to Mr. Thevet, who was so curious, that he took the Measures of the most principal of them, as follows; The Bones of the Legs measured full 3 Foot 4 Inches in length, and the Skull was 3 Foot 1 Inch about. Which Circumference, I observe, is exactly proportionable to the length of the Legs, and if we make an Allowance for the Hair and Skin that covered the Skull when he was alive it falls very little short of the Dimensions we have before set down, in computing the Size of our Giant's Head when it was entire.

Origin. Antwerp.
p. 207, 212,
Nat. Hist. l. 7,
c. 16.

Descript. of Ame-
rica, l. 27, c. 1.

And this brings into my Thoughts, as if it were not unlikely, that this large Os Frontis we have describ'd, might about 70 or 80 Years ago (for it seems fresh, and is still solid and ponderous, so that it cannot be very old) have been brought into Europe by some of the Trading Hollanders, as a proper Sample of some huge Gigantick Man, met with in some of their Voyages into America. But this is only Conjecture; and indeed, it does not import much whether we discover the true Original of it or no.

From these Warrantable Histories, and this Particular Bone before us as a fair Specimen, we may clearly deduce, that there have been in Nature Humane Bodies 11 and 12 Foot high; which equals, if not surpasses the Stature of the Tallest Giant mentioned in Holy Writ. For the Height of Goliath of Gath is said expressly to be but 6 Cubits and a Span; and taking a Cubit, in the most vulgar and usual Acceptation, for a Foot and a half, his Stature will not amount to above 9 Foot 9 Inches. Indeed we may reasonably conclude, that Og the King of Basan must have considerably exceeded Goliath in Height, if we make an estimate of his Stature by the Dimensions which are given of his Bedstead, which is said to have been kept as a Memorial of him at Rab-
bath

1 Sam. 17. 4.

Deut. 3. 11.

bath of the Children of Ammon, and to have been 9 Cubits in length; but then we cannot imagine, but that his Bed must of necessity have been much longer than his Body; and the least Allowance we can make for the Overplus, is the Space of 9 Inches above his Head, and as much below his Feet: and if we make this Deduction, 'twill follow he was not above 12 Foot high; much of the same Standard with this our Giant, whose Fore-head Bone is still kept in the *Medicine-School* at *Leyden*.

*A Man of a
Strange Imitating
Nature; by Lr.
Geo. Garden. n.
134. p. 842.
1677.*

III. At *Strathbogie*, not far from *Aberdeen*, there is a Man who hath something peculiar in his Temper, that inclines him to imitate unawares, all the Gestures and Motions of those with whom he converseth. His Name is *Donald Monro*, he is a little, old, and very plain Man, of a thin slender Body; he hath been subject to this Infirmary, as he told us, from his very Infancy. He is very loath to have it observed, and therefore casts down his Eyes when he walks in the Streets, and turns them aside when he is in Company. We had made several Trials before he perceived our Design; and afterward had much ado to make him stay. We Caress'd him as much as we could, and had then the Opportunity to observe, that he Imitated not only the scratching of the Head, but also the wringing of the Hands, wiping of the Nose, stretching forth of the Arms, &c. And we needed not strain Complement to persuade him to be covered; for he still put off and on as he saw us do; and all this with so much exactness, and yet with such a natural and unaffected Air, that we could not so much as suspect he did it on Design. When we held both his Hands, and caused another to make such Motions, he pressed to get free; but when we would have known more particularly, how he found himself affected, he could only give us this simple Answer, That it vexed his Heart and his Brain.

*A Negro Boy
dappled with
white Spots; by
Mr. Will. Byrd.
n. 235. p. 781.
1697.*

IV. Capt. *Cha. Wager* has a *Negro-Boy*, about 11 Years old, who was born in the Upper-parts of *Rappahanock* River in *Virginia*; his Father and Mother were both perfect Negroes. This Boy, till he came to be 3 Years old, was in all Respects like other Black Children, and then without having any Distemper began to have several little white Specks in his Neck and upon his Breast, which with his Age, have since been observed to increase continually very much, both in number and bigness; so that now, from the upper Part of his Neck (where some of his Wool is already turn'd white) down to his Knees, he is every where dappled with white Spots, some of which are broader than the Palm of a Man's Hand, and others of a smaller Proportion. The Spots are wonderfully White, at least equal to the Skin of the Fairest Lady, and are not liable to be Tann'd: But they are, I think, of a paler White, and do not shew Flesh and Blood so lively through them as the Skin of White People; but possibly the Reason of that may be, because the Skin of a Negro is much thicker. His Face, Arms, and Legs, are perfectly Black: He has all along been very Sprightly and Active, and has more Ingenuity too, than is common to that Generation.

*Physiognomy; by
Dr. Gwithen. n.
10. p. 118.
1694.*

V. Soft Wax cannot receive more numerous and various Impressions, than are imprinted on Man's Face by Objects moving his Affections: And not only the Objects themselves have this Power, but also the very Images or Ideas; that is to say, any Thing that puts the Animal Spirits into the same Motion

Motion that the Object present did, will have the same Effect with the Object. To prove the first, Let one observe a Man's Face looking on a pitiful Object, then a Ridiculous, then a Strange, then on a Terrible or Dangerous Object, and so forth: For the second, that Ideas have the same Effect with the Object, Dreams confirm too often.

The Manner I conceive to be thus; the Animal Spirits moved in the Sensory by an Object, continue their Motion to the Brain, whence the Motion is propagated to this or that particular Part of the Body, as is most suitable to the Design of its Creation, having first made an Alteration in the Face by its Nerves, especially the *Patbetick* and *Oculorum Motorij*, actuating its many Muscles, as the Dial-plate to that stupendious Piece of Clock-work, which shews what is to be expected next from the striking Part: Not that I think the Motion of the Spirits in the Sensory continued by the Impression of the Object all the way, as from a Finger to the Foot; I know it too Weak, though the Tenseness of the Nerves favours it: But I conceive it done in the *Medulla* of the Brain, where is the common Stock of Spirits; as in an Organ, whose Pipes being uncovered, the Air rushes into them, but the Keys let go, are stopt again: Now if by repeated Acts or frequent entertaining of the Idea's of a Favourite Passion or Vice, which Natural Temperament has hurry'd one to, or Custom dragg'd, the Face is so often put into that Posture which attends such Acts, that the Animal Spirits find such patent Passages into its Nerves, that it is sometimes unalterably set, (as the *Indian Religious* are, by long continuing in strange Postures in their *Pagods*,) but most commonly such a Habit is contracted, that it falls insensibly into that Posture, when some present Object does not obliterate that more Natural Impression by a New, or Dissimulation hide it. Hence it is, that we see great Drinkers with Eyes generally set towards the Nose, the Adducent Muscles being often employed to let them see their lov'd Liquor in the Glass in the Time of Drinking, which were therefore called *Bibitory*; Lascivious Persons are remarkable for the *Oculorum Morbilis petulantia*, as *Petronius* calls it. From this also we may solve the *Quaker's* Expecting Face, waiting the pretended Spirit, and the Melancholly Face of the Sectaries; the Studious Face of Men of great Application of Mind; Revengeful and Bloody Men, like Executioners in the Act; and though Silence in a sort may a while pass for Wisdom, yet sooner or later, *Sir Martin* peeps through the Disguise to undo all; a Changeable Face, I have observed to shew a Changeable Mind. But I would by no Means have what has been said understood as without Exception; for I doubt not, but sometimes there are found Men with Great and Vertuous Souls under very unpromising Outfides.

VI. By Pores, Physicians mean no more, than certain permeable Spaces between the Parts of a Body. Wherefore that there are Pores in the Skin of every Man's Body, is no more to be question'd, than whether Men do ever Sweat or Perspire. But in the Hands and Feet, these Pores are very remarkable. For if one will with an indifferent Glass, survey the Palm

The Pores in the Skin; by Dr. Neh. Grew. n. 159. p. 566. 1677.

Fig. 4.

Fig. 5.

of his Hand very well washed with a Ball, he may perceive innumerable little Ridges, of equal Bigness and Distance, and every where running Parallel one with another; and especially upon the Ends and first Joints of the Fingers and Thumb, upon the Top of the Ball, and near the Root of the Thumb a little above the Wrist. In all which Places, they are very regularly disposed into Spherical Triangles, and Ellipticks. Upon these Ridges stand the Pores, all in even Rows, and of that Magnitude, as to be visible to a very good Eye without a Glafs. But being viewed with one, every Pore looks like a little Fountain, and the Sweat may be seen to stand therein, as clear as Rock-water, and as often as it is wiped off, to spring up within them again. That which Nature intends in the Position of these Ridges is, That they may the better suit with the Use and Motion of the Hand: those of the lower side of every Triangle, to the Bending in or Clutching of the Fingers; and those of the other two sides, and of the Ellipticks, to the Pressure of the Hand or Fingers Ends against any Body, requiring them to yield to the Right and Left. And the Pores are placed upon these Ridges, and not in the Furrows which lie between them, that so their Structure might be the more sturdy, and less liable to be depraved by Compression; whereby only the Furrows are dilated or contracted, the Ridges constantly maintaining themselves, and so the Pores unaltered. And for the same Reason, the Pores are also very large, that they may still be the better preserved, tho' the Skin be never so much compressed and condensed, by the constant use and Labour of the Hand; and so those of the Feet, notwithstanding the Compression of the Skin by the Weight of the whole Body.

These Pores are a very convenient and open Passage for the Discharge of the more noxious and perspirable Parts of the Blood: which, by the continual Use of the Hands and Feet, are plentifully brought into them. Whence it is, that many Hypochondriacal Men, and Hysterical Women, have almost a continual Burning in the Soles of their Feet, and the Palms of their Hands: Yet not on the Top of their Feet, or Back of their Hands; which being less disposed to receive the noxious Parts, are therefore unfurnished with this kind of Pores.

*The Pores of
the Skin wholly ob-
structed by Nocturnal
Air; by --n.
8. p. 138.
1665.*

VII. Not many Years since, there was in this Country (near *Leyden*) a Student, who being much addicted to the Study of Astronomy, and spending very many Nights in Star-gazing had, by the Nocturnal Wet and Cold Temper of the Air, in such a Manner obstructed the Pores of his Skin, that little or nothing exhaled from his Body; which appeared hence, because that the Shirt he had worn 5 or 6 Weeks, was then as white, as if he had worn it but one Day. In the meanwhile, he gathered a Subcutaneous Water, of which, yet he was afterwards well cured.

*The great Ef-
fects of Touch,
and Friction; by
---n, 12, p. 206.
Hist. of Life and
Death. 6, Sect. 3.
1666.*

VIII. 1. My Lord *Verulam* observes, that Motion and Warmth (of which true Friction consists) draw forth into the Parts new Juice and Vigor, and conduce much to Longevity. And Mr. *Boyle* observes, how in

In our Stables a Horse well Curry'd is half Fed ; and how some can tell by the Milk of their Asses, whether that Day they had been well Curry'd or not ; Arguing hence, That if in Milk the Alteration is so considerable, it should be so likewise in the Blood, or other Juices, of which the Blood is elaborated, and consequently in divers of the principal Parts of the Body. To these Observations may be added what Dr. Beal not long since Communicated. 1. That he could make good Proof of the Curing or Killing a very great and dangerous Wen (that had been very troublesome for 2 or 3 Years) by the Application of a Dead Man's Hand, whence the Patient felt such a cold Stream pass to the Heart, that it did almost cause in him a Fit of Swooning. 2. That upon his Brother's Knowledge a certain Cook in a Noble Family, being reproached for the ugliness of his Warty Hands, was bid by his Lord to rub his Hand with that of a Dead Man ; and that his Lord dying soon after, the Cook made Use both of his Lord's Advice and Hand, and speedily found good Effect. 3. That a Gentleman, who came lately out of Ireland, informed him of an Aged Knight there, who having great Pain in his Feet, insomuch that he was unable to use them, suffered a loving Spaniel to lick his Feet Mornings and Evenings, till he found the Pain appeased, and the Use of his Feet restor'd. This, saith the Relator, was a gentle Touch, and Transpiration ; for he found the Spirits transpire with a pleasing kind of Titillation. 4. That he can assure of an Honest Blacksmith, who caused Vomitings by stroaking the Stomach ; gave the Stool by stroaking the Belly ; appeased the Gout and other Pains, by stroaking the Parts affected.

2. 'Tis near 20 Years since I saw Mr. Greatrix Stroak any: But I give you nothing here, which several Friends, who were Eye-witnesses, as well as myself, do not remember, and think exactly true.

My own Brother, John D---n was seized with a violent Pain in his Head and Back ; Mr. Greatrix (coming by Accident to our House) gave present Ease to his Head, by only stroaking it with his Hands. He then fell to rub his Back, which he most complained of ; but the Pain immediately fled from his Hand to his Right Thigh ; then he pursu'd it with his Hand to his Knee, from thence to his Leg, Ankle and Foot, and at last to his great Toe. As it fell lower, it grew more violent, and when in his Toe it made him roar out, but upon rubbing it there it vanish'd.

My Uncles Daughter was seiz'd, when a Girl, with a great Pain and Weakness in her Knees, which occasion'd a white Swelling ; this followed her for several Years, and having used divers Means to no Effect, after 6 or 7 Years time, Mr. Greatrix coming to Dublin, and Lodging at my Father's, my Aunt brought her to him. He stroak'd both her Knees, and gave her present Ease, the Pain flying downwards from his Hand, till he drove it out of her Toes, and the Swelling, in a short Time, wore away, and never troubled her after.

I had also a Comrade, who, after a Fever, was much troubled with a Pain in her Ears, and very Deaf ; Mr. Greatrix put some of his Spittle into her Ears, and turning his Finger in her Ears, rubbed and chafed them well, which cured her both of the Pain and Deafness: And an opposite Neighbour

tells me, That her Uncle was Cured by him of the same Malady. Another told me, That when a Child, being extreemly troubled with the Kings-Evil, she was Touch'd by King *Charles II*, but she was nothing the better: but Mr. *Greatrix* perfectly Cured her. A Smith near us had two Daughters extreemly troubled with the Evil, the one on the Thigh, and the other in the Arm; he cured them both: One of them lives still there; she is a Healthy Woman, and the Mother of several Children. The Scars of the Evil Sores still remain on her Arms, though it is 20 Years since it was cured; since when she never had any Symptoms of it.

Where Mr. *Greatrix* Stroakt for Pains, he used nothing but his dry Hand; if Ulcers or running Sores, he would use Spittle on his Hand or Finger; and for the Evil, if they came to him before it was broke, he Stroak'd it, and order'd them to Poultess it with boil'd Turneps, and so did every Day till it grew fit for Lancing, he then Lanc'd it, and with his Fingers would squeeze out the Cores and Corruption, and then in a few Days it would be well with only his Stroaking of it every Morning; but if it were broke before he saw them, he only squeezed out the Core, and healed it by Stroaking. Such as were troubled with Fits of the Mother, he would presently take off the Fit, by only laying his Glove on their Head; but I never knew any that he cured of that Distemper, for their Fits would return; but I have heard he cured many of the Falling Sickness, if they stayed with him, so that he might see them in 3 or 4 Fits, else he could not Cure them.

*A Girl in Ireland
with Horny Ex-
crescences; by
Mr. St. Geo. Ash.
p. 176. p. 120a.
1685.*

IX. 1. This Horny Girl is called *Anne Jackson*, born in *Waterford* of English Parents, who are both said to have been sound and healthy; this Infirmary did not shew itself, till she was about 3 Years old. She is now about 13 or 14 Years of Age, yet can scarce go, and is so little in Stature, that I have seen Children of 5 Years old taller; she is very silly, speaks but little, and that not plainly, hastily and with difficulty, her Voice is low and rough; her Complexion and Face well enough, except her Eyes, which look very dead, and seem to have a Film or Horn growing over them, so that she can hardly now perceive the difference of Colours. The Horns abound chiefly about the Joints and Flexures, and not on the brawny Fleishy Parts of her Body; they are fastened to the Skin like Warts, and about the Roots resemble them much in Substance, tho' toward the Extremities they grow much harder and more horny; at the End of each Finger and Toe, grows one as long as the Finger or Toe, not strait forwards, but rising a little between the Nail and the Fleish (for near the Roots of these Excrecencies is something like a Nail) and bending again like a Turkey's Claw, which too it much resembles in Colour; on the other Joynts of her Fingers and Toes are smaller ones, which sometimes fall off, others growing in their Places. The whole Skin of her Feet, Legs and Arms, is very hard and Callous, and does daily grow more and more so; on her Knees and Elbows, and round about the Joynts, are many Horns; two more remarkable at the Point of each Elbow, which twist like Rams Horns, that on the left Arm is above $\frac{1}{2}$ Inch broad, and 4 Inches long; on her Buttocks grow a great number, which are flat by frequent sitting; at her Arm-pits and the Nip-

Nipples of her Breasts, small hard Substances shoot out, much slenderer and whiter than the rest; at each Ear also grows a Horn; the Skin of her Neck does of late begin to turn Callous and Horny, like that of her Hands and Feet. She Eats and Drinks heartily, Sleeps soundly, and performs all the Offices of Nature, like other healthy People, except that she never had the Evacuation proper to her Sex.

2. In May, 1678, at the Hospital at *Paris*, called *La Charité*, I saw a Young Lad of *Brie*, between 19 and 20 Years Old, who had, upon the Ends of all his Fingers, as it were, Horns grew out; one whereof, upon the middle Finger of his Right-hand, was 310 Grys long, and 130 Grys circumference. He told me, he had one formerly on his Thumb, much bigger and longer than this, but it was now very short. The like grew also upon the Toes of his Feet, only excepting the two small Toes of each Foot, where there were now none, and upon 3 of them there never had been; upon the 4th there had been one, but it having fallen off about 6 Months since, came no more, but left the Nail very little different from Natural. This Horny Substance grew not out of the End of the Fingers, but was, as it were, a thickning of the Nail, which, instead of growing out in length, increased in thickness; but rose not up straight in a Perpendicular Line to the Finger, but as it augmented bended forwards, and so grew somewhat into the shape of a Bird's Claw, but that it was not taper and sharp like that, but blunt at the End, and almost of the same bigness all along, and full of pretty deep Chaps in the Convex part, but the Concave was without any. He had no sense in the Horny part itself, but that Part where it Joyns to the Flesh is very sensible and tender. There are also, in several Parts of the Back of his Hands, Horny Excrescencies, some pretty broad, and other, less, but none rising much above the Skin; but they look there, those that are broad, like flat but very broad Warts; but to the Touch, they feel much harder.

This Disease began about 3 Years before, after having had the Small-Pox. His Food was the usual Food of the Country. He has been purged twice since he came into the *Charité*; and some of the Horns of his Fingers begin to loosen at the Roots.

N. B. A Gry is the one thousandth part of a *Philosophical Foot*, which is the 3d part of a Pendulum of Seconds; So that 310 Grys is a little more than 4 English Inches.

X. 1. About 43 Years since, the Body of a Woman was buried here (at *Norimbergh*) in a Coffin of Wood, painted (according to the Custom here used) with Black. The Earth in which it was buried was dry and yellow, as the Earth, for the most Part, is near this City round about. The Corps lay the lowest of three in the same Grave, there being two other Corps over it. Through the Clefts of the Coffin, much Hair was thrust out, and had grown very plentifully, insomuch, that 'tis believ'd that the whole Coffin may, for some time, have been all covered with Hair. The Cover of this Coffin being removed, the whole Corps appeared perfectly resembling an Human Shape, exhibiting the Eyes, Nose, Mouth, Ears, and

A Boy in France with Horny Excrescencies; by Mr. Locke n. 230. p. 594. 1687.

A body, after being long buried, almost wholly converted into Hair; by Ph. Col. n. 2. p. 10.

And all the other Parts; but from the very Crown of the Head to the Sole of the Foot, covered over with a very thick set *Hair*, long and much curl'd. The Sexton, after a little viewing of it, going to handle the upper Part of the Head with his Fingers, found immediately all the Shape of the Body to fall, and left nothing in his Hand but a Handful of *Hair*; there being neither Scull, nor any other Bone left, unless it were a very small Part of that which he suspected to be the great Toe of the Right Foot. This *Hair* was somewhat rough at first, but afterwards it grew very much harder, and of a Brown Red Colour.

By M. Chr. Arnold. *ib.* p. 50.

2. Besides the Relation of M. *Wulferus*, concerning the *Hairy Corps* here lately discovered, it hath likewise been observed, that one Executed and Hanged at this Town for Theft, within some space of Time, was strangely overgrown with *Hair*, all his Body over upon the Gallows.

Observations of
Hair found in several
Parts of the
Body; by Dr. Ed.
Tyson. Ph. Col.
n. 2. p. 11.
* Lib. 3. de
Plantis.
† Hist. & Obs.
med. Cent. 1.
Obs. 10.

3. 'Tis the Opinion of the Learned *Honoratus Fabri* * and others, that *Hair*, Wool, Feathers, Nails, Horns, Teeth, &c. are but Animal Vegetables or Plants; if so, we may be the less surpriz'd at their growth on the Body even after the Decease of the Animal: and as there have been other Examples, so the foregoing Observation is a remarkable Instance thereof. *Petrus Borellus* † thinks, that as Plants, they may be transplanted, and made to grow in a Soil they did not at first; and some Remarks he gives thereon. What he relates concerning Teeth being drawn and set again, I know to be true, having tried it formerly in myself, and have heard of the like done by others.

As for *Hair*, though the outward surface of the Body be the usual Place where it grows, yet hath it been sometimes found on the Tongue, upon and in the Heart, in the Breasts, and Kidneys, and other Glandulous and Muscular Parts of the Body: But there is scarce any inward Part more subject to it than the *Ovarium*, or Testicles of Females. I have lately met with 3 Instances of it; an Account of which may possibly gratify the Curious.

The first was in a Bitch I dissected in my Chamber at Oxford, An. 1674. where I observed the *Omentum* larger than usual, but so fasten'd to the *Intestines*, the extreams of the *Cornua Uteri*, and to the Right-side, that I could not readily separate it. Where the Adhesion was, it was somewhat inflam'd, and had there several small Glands. But I very much wonder'd to find here *Hair* growing, some on the *Omentum*, others on the *Cornua Uteri*, others in the *Ovarium*; several of them did lie loose in the Veins, and two or three I found in the right *Ventricle* of the *Heart*; others were rooted in small Glands. The *Cornua Uteri*, at their extreams, were joyned together; and both *Testicles* made but one large rude *Glandale*. It had several Sinous Cavities within, filled with a purulent Matter and *Hair*. In the *Cornua Uteri* were the *Vestigia*, or Tracts of former *Fetus's*. Before Dissection, I observed the foreparts of the Bitch to be well, but the hinder were very much emaciated. This *Hair* was about an Inch, or an Inch and an half long; and although found in so many Places, yet not much in all. It resembled somewhat some of the *Hair* of the Skin.

My next Observation, was in a Young Gentlewoman I was at the Dissecting of, together with Dr. Morton, Dr. Dan. Cox, &c. in Nov. 1679. Where, besides several other Particulars we did observe that may more nearly relate to the Cause of her Death, and lingring Illness, we observed an unusual Tumor of the right *Testicle* or *Ovarium*, which was swelled into two Vesicles or Bags, almost as big as a Man's Head; one of these was much less than the other; both consisted of a thin Membrane, and had a free communication on the inside one with another; they were filled with a Liquor and Substance much resembling Curds and Whey; for a thin pale *Lympha* or *Serum*, there did swim in several lumps and pieces a *Steatomatous* or cruddy Matter, which, to the Touch, was soft and fatty, of a dilute yellowish Colour, and of no ill or remarkable Smell. Some of it being put into warm Water did, in part, dissolve. The inside of these Bags was smooth, and without the adhesion of this Matter, and in no Place, as we observed, discoloured. One of these lumps or pieces was half as big as a Man's Fist, and in it we found a great deal of *Hair*, as likewise in the other pieces, but not in so great plenty. This *Hair* was of a Silver colour, very soft and fine, but strong; and some of it 2 Foot and 3 Inches long. It did not seem to grow or to be fastened to any Part, but to lye entangled in this cruddy Matter. By keeping, this *Hair* is grown something browner, and by often handling, and by freeing it from that cruddy or fatty Substance, much of it broken shorter. But on the outside of the larger Bladder or Bag, we met with the remaining Part of the *Ovarium* or *Testicle*, and in it we observed several Eggs, or, at least, *Hydrides*, of this [oo] bigness. But we were more surpriz'd to find there a Bony Substance, which so exactly represented an Eye or Dog-tooth in its shape, hardness, colour, and all things, that I cannot better liken it to any thing besides. It firmly adhered at its Basis, where 'tis broadest, to the Membranes of the *Ovarium*, and had of each side of it (at small Distances) two other Bones or Teeth, but they were but small, and not of so regular a Figure.

This *Tooth* and *Hair* gave a Suspicion to some, that possibly they might be the Parts of a corrupted *Embryo*, but I rather think not; for if so, we should have met with Bones, or, at least, a purulent Matter; besides, the *Tooth* was without the *Cystis* or Bag, in the *Ovarium*, the *Hair* within. I rather look upon it as a *Lusus Naturæ*, her endeavouring to form something, and being disappointed of an Animal, produced a Vegetable. Teeth and Bones, at first, are soft Membranes or Tendons hardening into Cartilages, and Cartilages into Bones. The Tendons of the Legs of Fowl, as of an old *Turky*, become Bony; so have I seen the *Ateria Aorta*, Part of the *Emulgent* and *Iliac* Branches of a Woman at Oxford, that were *Offens.* Dr. Willis mentions the like of the *Carotid Artery*, and I have seen it also in the great Artery near the Heart in a Horse, and 'tis often to be met with in the Hearts of Oxen and Deer. Once I observed the outward Membrane of the Liver in a Human Body, that was part Schirrous, part Bony; once I met with the same in the *Spleen*, and at another Time (in an Ancient Gentleman) on the outside of the *Lungs*. So that even here possibly,

ably, Part of the *Ovarium* being as it were Callous or Schirrous, it might *Offse*, and some unknown Circumstances might determine and shape it into a Tooth.

As for the *Hair* in the Bag or *Cystis*, I am apt to think, that that fatty Substance, in which it was contained, might contribute much towards it; as the Thread of Silk-worms, the Cobwebs of Spiders, so Cotton, the Thrums of the *Gramen Tomentosum*, &c. are from particular Juices. But here they have their strainers through which they shoot, or are as it were wyre-drawn. The *Hair* mentioned in the foregoing Observation was most of it radicated in small Glands; but as for that of this, like as some Plants that thrive by sending their Roots into a Fluid Body, the Water, this *Steatomatous* or fatty Substance might prove a sufficient Soil for propagating and producing them; which I am the more apt to believe, since in the following, and some other parallel Histories, where such *Hair* hath been found, likewise this pinguious or fatty Substance hath also been observed.

Therefore my 3d Observation is of a Gentlewoman, aged about 39 Years, who for a considerable Time had been troubled with various Symptoms of the Stone in the *Kidneys*, as bloody Urine, great Pains, Vomiting, &c. which in all probability were the greatest Cause of her Death. Upon opening her Body, there was observed near the *Uterus* a *Cystis* or Bag about the bigness of a large Turkey's Egg, and in it a like fatty Substance, as before expressed, as also a great Quantity of light soft *Hair*. Fasten'd to a fleshy Substance, within the *Cystis* was a Bone, in some sort resembling a *Mandible*: for it had several Sockets, in which were seated 3 large *Dentes Molares*, or Grinders, in a Triangle, and a 4th not yet quite grown out. In one of the *Kidneys* was found a large Stone.

How subject this Part is to such *Hairy* Tumours, may further appear from the Histories of others; but they make no mention of *Teeth* found there; but I have been acquainted, that the Learned Dr. Needham, Dissecting a Woman here in Town some Years ago, in one of the *Ovariums*, which was very much swelled, found both a Tooth and Hair there.

An Observation
consonant to it,
upon the Dissect-
ing a Morbid Bo-
dy; by Dr. Samp-
son. Ph. Col. n. 2.
p. 49.

4. In a Woman lately Dissected, who was the Day before her Death with great Difficulty delivered of a dead Child, there was found 2 great globose Tumors depending upon the Left *Testicle*, and may rather be called preternaturally grown Eggs, or Parts of the extended *Ovarium*: Both of them lay in the *Pelvis* under the Womb, and so hindered the Egress of the *Fetus* which was well grown and big. They were covered with a thick Membrane, which had its Veins and Arteries as conspicuous as those are in the Urinary Bladder. That nearest to the *Testicle* was the least, of the bigness of a Coco-nut, which had in it a fatty Substance, not fluid, of the Colour of the yolk of an Egg, and in the midst of it a Lock of *Hair*, which when it was freed from the Grease, appeared of a flaxen Colour: The Fat itself crackled in the Fire, melted and took Flame like Lard, and in a Spoon over a Candle would boyl and smoak, excepting some small grumose Parts. In the midst of the Membrane was a hard and knotty Substance, in which lay a small Bone of a strange shape, with a *Periostium* upon it, which was hard to separate from it. The Bone is hard, white,

white, and somewhat bigger than the biggest of the Bones in the *Meatus Auditorius*.

The other Tumor was thrice as big as the former, and about 2 Inches distant from it, yet connected to it by a strong Membrane of the extended *Tunicle*. Opening it, there sprung out a more white and liquid sort of Grease, but in the middle was as thick as the former, and of the Colour and Constitution of Live-Hony; for which Cause it may be called a *Meliceris*, though the Inflammability both of this and the other makes them both *Steatomata*. In the midst of this lay envelop'd a large Lock or two of Hair, variously entangled like those the Country-men call *Elf-locks*, which are the Species of the *Plica Polonica*. The Colour was of a blackish Brown, and the Quantity four times as much as the former. Some Part of this Hair was long, and evidently grew out of the inward Parts of the Membrane, in which it was radicated, and from whence it was plucked. This Fat was more inflammable than the other, neither did it crackle in burning as the former, and left fewer Spots in the Spoon. In the Duplicatures of this Membrane also was a Lump, which contained another mishapen Bone, very hard and hollow, covered with a Skin like a *Periosteum* without, and the *Dura Meninx* within: So that it is hard to say, whether Nature was forming a Tooth with part of the Jaw, or the whole *Cranium*.

XI. The *Parenchymous* Parts of the Body, are by Anatomists generally supposed to be in very many places wholly void of Vessels, design'd chiefly to fill up Cavities and Interstices between the Vessels, and to bolster up the same, and to convey them through the Parts.

The Parenchymous Parts of the Body; by Sir Edm. Kirg. n. 18. p. 316.

But, having many Years endeavour'd to excarnate several Parts of the Body, viz. the *Liver, Lungs, Spleen, Kidneys, &c.* (not to name the *Placenta Uteri*, which seems to be *Parenchymous* too;) and being very desirous to make a Scheme of the Vessels of any of these, whatever they were, I fixt upon; I found, notwithstanding all my Care to preserve the Vessels, when I was freeing them as heedfully as I could from the supposed *Parenchyma*, that, in every Breach I made either with my Fingers or otherwise, all my Endeavours were destructive to my Purpose. And that upon Examination of those Bits, much of which is called *Parenchyma*, I met in them more Vessels than I had preserved in the Parts whence they came: And, though the Portion were never so small, yet my bare Eye could make this discovery; much more could I, when assisted by a Microscope, perceive I had destroyed more Vessels than preserved, in despite of the exactest Care I was capable to Use. Then, reviewing what Mischief I had done in every Place, quite through the whole Tract of my Fingers, Knife, &c. I began to think with myself, That it was not impossible for these Parts to consist wholly of Vessels curiously wrought and interwoven (probably for more Uses than is yet known;) and the Consideration, which came into my Mind, of a Piece of fine Cloth (which consists of so many several minute Hairs call'd Wool) was no discouragement to this Opinion. I then reiterated Experiments over

and over; some of which proved so successful, to my Apprehension, that I was encouraged in the Year 1663 and 1664, to discourse of it to several very Worthy Persons; as Mr. Boyle, Sir Will. Petty, Dr. Williams, Dr. Lentbal, Dr. Gaspar Needham, Dr. Sampson, (who afterwards sent me a Letter from France, intimating the Acquaintance he had made with the Learned Steno, who hath since Publish'd something of the same Discovery) Mr. Daniel Cox, and Dr. Sam. Parker, &c. who doubtless cannot but remember, that then I related to them, I found much cause to believe, that that Substance, commonly call'd *Parenchyma*, was in most, if not in all its *Parenchymous* Parts, full of Vessels; however, it had been Imagined by all, I could ever meet with, to consist in great Part of a Substance, in many Places void of Vessels, design'd for such Uses, as are above-mention'd. Against which, I have now further to alledge; 1. That I observe in a piece of Musculous Flesh (so call'd) either Raw, Roasted, or Boiled, &c. that, if I so far extend it, as to make it to be seen through, I can (assisting my Eye) perceive it full of Vessels placed as thick as is possible to be imagined (the Fat, if there be any, being first removed) there appearing then nothing but Vessels, yet so as with a *Microscope* may be seen through, when they are extended. 2. That if any one, as he is at Dinner, take a piece of Flesh, and begin either at the Head or Tail of a *Muscle*, he may divide it *in infinitum*, all along from Head to Tail, without breaking any thing of that called Flesh, only these transverse Fibres that seem to stitch them together, and (as I am apt to think) pass through the very Bodies of the smallest of them, and quite through the whole Muscle up to the cutaneous Porosities; so that there is not one of these small *Ducts*, that run *per longitudinem*, but 'tis furnish'd with a sufficient number of Out-lets, when need requires, though too minute to suffer any Alimentary Juice to pass transversely (in a living Body) or any other Liquor when the Body is Dead and Cold. But, to wave their Use at present, and to return to what I was saying, compress between the Fingers this Bit of Flesh, and you shall find the Juice, especially if the Meat be hot, to go before your Fingers toward either End you please; but, if you Compress both Ends, you shall see it swell in the middle; and again, if you press the middle, it will run out at both Ends. But further, suppose a piece of Flesh, called *Parenchyma*, as big or as little as you please, in any Part of the Body, and let me prick it with a Needle, where you shall appoint; if you feel it, I presume you will acknowledge, a Nerve or a Fribilla related to it is touched: If you feel it not, I am sure some Liquor, either sanguineous or other, will follow the Needle: And from whence can that come but out of Vessels (unless accidentally, as by a Contusion, &c. it be extravasated; In which Case my Argument will not be injured, because the Part is depraved, whereas I speak of the Parts as they are in their Natural State.

To Confirm and Illustrate all which, I desire, that the following familiar Observations may be consider'd:

1. If a Horse, fat and fair to look on, without a hollow to be seen between his Muscles, be rid extream hard, and into a great Sweat, and then

then kept one Day without Water or moist Meat, you shall see him look so thin in many Places, as in the Musculous Parts, that you will hardly believe it to be the same Horse, especially if he be (as the Phrase is amongst Horse-Masters) a *Nash* or *Wash* Horse. The cause of which Thinness will easily be granted to be only an Exhaustion of Juice, expended out of the Blood, which did stuff out these Vessels. And whoever, that is used to ride hard, shall observe how this foul Horse breathes, and at what a Rate he will Reek and Sweat, will not much wonder at the Alteration. But, if the Horse be a hardy one, and Use to be hard ridden, then you will see that one Day's rest, and his Belly full of good Meat and Drink, will in one Day or two restore him to his former plight, the Food being within that short Space of Time so distributed, that all the Vessels will be replenished again, as before. And the cleaner the Horse is, the sooner recruited, and the less sign of hard Riding will appear. This seems to shew the facility, with which the Juice, called Blood, passeth; which surely, if there were such a thing as a *Parenchyma*, might by several Accidents (not difficult to mention) be so deprav'd in several Parts of it, that it might loose its receptive Faculty; than which it may be thought to have none of greater Use, being supposed to be without Vessels:

2. Discoursing sometimes with Grasers in the Country, about the Pasture of Cattle, I have been informed by them, That, if they buy any old Beasts, Oxen or Cows to feed, they choose rather those that are as poor as can be, so they be sound; because that, if they are pretty well in Flesh, what they then add to them by a good Pasture, though it make them both look and sell well, yet it will not make them eat so well, their Flesh proving hard and very tough: which some may suppose to be the Age of *Parenchyma*; and so it is, of that so call'd. But, if those Beasts be old and extremely poor, then they feed very kindly, and will be not only very fat, but spend well, like young ones, and eat very tender. Of which I take the reason (excluding a *Parenchyma* now) to be this: When an Ox or a Cow is grown Old, and in an indifferent plight as to his Flesh (for so it is called) all these Vessels, having been kept at that size for the most Part, have contracted a tenseness and firmness, and their Fibres less extensive, not so fitted for the Reception of more unctuous Particles to relax them; and that additional unctuous Matter, which occasions fatness, is forced to seek new quarter, any where (often remote from Muscles) where it can be with least difficulty received; sometimes to one Place, sometimes to another, as may be seen in Shambles. Whereas, if there were such a thing as a *Parenchyma*, that certainly would like a hungry Sponge immediately swell up in several Parts, (which without much difficulty might be discovered in the dissection) and more eminently where it should find the Pores most patent: And in the dissection of such Muscles it would be very strange, not to find some, if not many Pieces of them in various shapes, to the great inconvenience of the Parts in which they are seated: Which yet, I confess, I could never find in any Muscle, unless it were where there had been a Contusion, or an Impostume, or the like. But,

According to my Opinion of the *Parenchymous* Parts, the reason why the Flesh of a very lean Ox or Cow, that hath got new Flesh in a good Pasture, eats tenderer, seems to be this: That, in a very lean Beast, the Vessels, designed for admitting and distributing the nourishing Juice, are so near contracted, and lie so close together, that, when once they are relax'd by fresh and unctuous Nourishment, they extend every way in all extensive Parts, until in a short Time the whole Creature is, as it were, created anew, having got new Flesh upon old Bones. And the Necessity of extream Extension makes all those Parts, that are, as has been said, for the admission of Nourishment, so thin and fine, that it will make the lean Beast, put into a Rich Pasture, eat young and tender: Whereas one of the same Age, that never was very poor, fed in the same Pasture shall eat hard and tough.

3. It has been observed, that *Corpulent* Persons in some Diseases that seize on them do fall away to wonder, not only in the Waste, but in the Arms, Legs, and Thighs; and the very Calves of the Legs have been observ'd so flaccid and loose, that one might wrap the Skin about the Bones. Thereason whereof, according to the Opinion delivered, may be easily rendered to be a great consumption of the stock of Liquors, that in Health kept the Vessels turgid; which Vessels I suppose to make up those Muscles. But, when the Pores are obstructed, that the Nourishment is hindred (which then also uses to be but sparingly administred) and Sweats, either spontaneous, or forced are large, there must needs be a great Expence of those Liquors, the supply being but inconsiderable: Which cannot but contract all these Ducts of all Sorts nearer together, and make them much less in themselves, meerly from Exhaustion: Or, if there should be no Sweats, the internal Heat spends the Spirits, and dries up the Liquors, the consequence whereof may reasonably be presum'd to be this Flaccidity of Parts, and great and sudden Change made in them; not that there is need of any *Parenchyma* to fill up these Muscles, considering what hath been said.

A Child, about 6
Years Old, who in
Face was as large
as a full grown
Woman; by Dr.
Hen. Sampson.
No. 217. p. 80.

XII. One *Hannab Taylor*, (born in *Crouched Friars*, June 12. 1682.) was till 3 Years old very sickly, lean, and not able to go alone; but about *Bartholomew-tide*, 1685, she began to grow strong and fat, which increased till the Time of her Death: She was also a very forward Child of Understanding, had her *Pubes* grown thick and long, as also Hair under her Arm-pits, and a Downiness upon her Chin, unusual with those of her Sex, except in some aged Persons.

About half a Year before she dy'd she began to complain of Pains, especially on her left side, and voided Gravel often by Urine and with pain. Her-Breath was freight, as is usual to Fat People, especially when she went up a Pair of Stairs: yet, on that very Evening before she dy'd, she walked abroad, was merry and lively, went to Bed and slept as at other Times; but after Midnight awaked, cry'd out of a great pain in her Side, and said, Mother, I want breath, I shall dye; and in less than a quarter of an Hour was quite dead.

The Measures and Weight of her Body were as followeth: Round the Breast a Yard and 2 Inches, over the Hips at the Navel 1 Yard 5 Inches, over

over the Stomach 1 Yard: Her Height 1 Yard wanting an Inch, round the Thigh 1 Foot 9 $\frac{1}{2}$ Inches, Calf of the Leg 13 Inches, upper Part of the Arm 14 $\frac{1}{2}$ Inches, the Wrist 7 Inches; her Weight 95 *l*. She had a Face as big and broad as any Fat grown Woman of 20 Years. Her Chin and Breast were so thick laid with fat, that she was forced to hold up her Head, (or rather throw it backward) as she walked. These Measures were all taken before the Dissection. The Thickness of the Fat upon the Muscles of the *Abdomen* was 2 Inches, and not much less upon the *Sternum*: After the Fat was removed (which was as much as is usually in most fat and grown Persons) the *Abdomen* was yet very protuberant and round, and yet the Fat contain'd therein not extraordinary much, neither on the *Omentum* or *Mesentery*: Yet it was more than is usual in well fed Persons, and so much that with the bigness of the other internal Parts (which were all of the largest size) it made her have so big and protuberant a Belly. The Guts were all inflam'd and thick, the Liver large, the left Kidney (where was the seat of her Misery) exceeding large, and double the Bigness of that on the Right side; upon the Dissection whereof there issued out a vast quantity of Blood, both from all the Vessels of it, and out of its *Pelvis*; and after several times spunging of it, yet it came flowing in from the *Emulgent Artery*: A certain argument of a great plenitude in the *descending Trunk*, which caused the Inflammation in the *Mesentery*, and the *Nephritis* in the Kidney. Here was also some small Gravel, which possibly had choak'd up the *Ureter*; though that was not examined: but, because there was no Blood in the Bladder, I justly make this Conjecture. The Uterine Parts had nothing bigger, or more remarkable than in others of her Age. The *Testicles* were large, but smooth and white, without protuberances or shew of Eggs. The Bladder had a purulent Matter in it. When the Breast was denuded of its Fat, it shewed no bigger than of another Child of her Age. The Cavity was totally filled with the *Lungs* and *Heart*. The *Heart* was well, and had very strong Fibres, and no *Polypus*. But the *Lungs*, besides that they were extended to fill up the whole Cavity, were annexed strongly to several Parts of the *Pleura*, and had several Protuberances as big as Nutmegs fill'd with a Pulp like an *Atheroma*, and were in divers places rotten and corrupted. The evident Cause of her Death lay in the Inflammation of the lower Parts, but the suddenness thereof must be from some Impression which that Inflammation made upon the Original of the Nerves moving the *Diaphragm*, *Bronchia*, and other Parts of *Respiration*, for her great and only Complaint was want of Breath. Besides, her very Face and Head were miserably Coloured with Redness of stagnant Blood. The Head was not opened.

XIII. Sir F. L. was swell'd mightily in his Legs, *Abdomen*, Stomach, and to his very Throat, even to Suffocation, that he dy'd. Mr. K—, was sent for to let out the supposed Waters; for his Physicians had treated him as in a *Dropsy*, with powerful *Diureticks*, &c. and 1 or 2 Pails were provided ready to receive the Matter; but upon opening him there issued forth nothing but a Gush of Wind. He cut 6 Inches and a half deep of

*Corpulency mis-
taken for a Dropsy;
communicated
by Mr. Green-
hill m. 265. 266. 180*

Fat

Pat on the Peritoneum, and dy'd of a Corpulentia nimia, being one that fed prodigiously.

XIV. Accounts of Books Omitted.

- n. 167. p. 866. 1. **M**edicina Septentrionalis Collatitia, s. Rei Medicæ nuperis Annis à Medicis *Anglis, Germanis, & Danis* emissæ Sylloge & Syntaxis; Operâ *Theophili Boneti, D. M. Genevæ, 1685. in Fol.*
- n. 105. p. 113. 2. *Anatome Corporis Humani, conscripta ab Isbrando de Diemberbroeck, M. D. Ultrajecti, 1671. in Quarto.*
- n. 178. p. 1309. 3. *Godefridi Bidloo, M. D. Anatomia Humani Corporis. Amstel. 1685, in Fol.*
- n. 183. p. 4077. 4. *The Chirurgical and Anatomical Works of Paul Barbette. M. D. Together with a Treatise of the Plague. Englished out of Low-Dutch. Lond. 1672. in 8vo.*
- n. 40. p. 811. 5. *Franc. de le Boe Sylvii Praxis Medicæ Idea nova. Lugd. Batav. 1667.*
- n. 71. p. 2159. in 12mo. & 1671.
- n. 88. p. 5105. 6. *Thesaurus Medicinæ Practicæ; Studio & Operâ Thom. Burnet. M. D. 1672. in 4to.*
- n. 118. p. 435. 7. *Jacobi Barneri Ph. & Med. D. Prodrômus Sennerti Novi, seu Delineatio novi Medicinæ Systematis, &c. Augustæ Vindelicorum, 1677. in 4to.*
- n. 162. p. 704. 8. *Joh. Dolæi, M. D. Encyclopædia Medicinæ Theoretico Practicæ, &c. Francofurti ad Mænum, 1684. in 4to.*
- n. 174. p. 1140. 9. *Mich. Ettmulleri Opera omnia Theoretica Practica, &c. Lond. 1683. in 4to.*
- n. 41. p. 835. 10. *A Discourse concerning Physick, and the many Abuses there of by the Apothecaries. Lond. 1668. in 8vo.*
- n. 121. p. 513. 11. *The Colledge of Physicians Vindicated, and the true State of Physick in this Nation faithfully represented, &c. by Char. Goodall. M. D. Lond. 1676. in 8vo.*
- n. 92. p. 6175. 12. *Apologema pro Urinis Humanis; Auth. Antonio Eygel. M. D. Amstel. 1772. in 8vo.*
- n. 154. p. 425. 13. *De Urinis, Pulsibus; de Millione Sanguinis; de Febribus; de Morbis Capitis, & Pectoris. Opus Laurentij Bellini: Bononiæ. 1683.*
- n. 171. p. 1023. 14. *Dav. Abercrombij M. D. de Variatione ac Varietate Pulsus Observationes. Accessit ejusdem Authoris nova Medicinæ, tum Speculativæ tum Practicæ, Clavis, &c. Lond. 1685. in 8vo.*
- n. 76. p. 2289. 15. *Joh. Bapt. Sylvatici. Institutio Medica de ijs qui Morbum Simulant deprehendendis. Francofurti ad Mænum, 1671. in 12mo.*
- n. 107. p. 162. 16. *Tho. Bartholini de Anatome Practicâ ex Cadaveribus Morbosis adornanda Consilium: Hafniæ. 1674. in 4to.*
- n. 50. p. 1018. 17. *Observationes Medicæ, Mich. Leyseri, Henr. a Moinichen, Mart. Bogdani, Jac. Seidelii: à Musæo Tho. Bartholini. Hafniæ. in 8vo.*
- n. 34. p. 1094. 18. *Theodori Kerckringij, D. M. Spicilegium Anatomicum; continens Observationum Anatomicarum rariorum Centuriam unam, nec non Osteogeniam Foetuum. Amstel. 1670. in 4to.*
- n. 125. p. 621. 19. *Two Treatises; the one, Medical, of the Gout by Herman Buschhof Senior*

Senior, of *Utrecht*, the other partly Chirurgical, partly Medical, containing some Observations and Practices relating to some extraordinary Cases of Diseases in both Sexes; by *Hen. Van Roonbuijs*; *Englished* out of *Dutch*, *Lond.* 1676. in 8vo.

20. *Caroli Dralincurtij Experimenta Anatomica*; quibus adjecta sunt plurima Curiosa super Semine Virili, Fœmineis Ovis, Utero Uterique Tubis, atque Fœru. *Lugd. Bat.* 1684. in 12mo. n. 169. p. 945.

21. *Dr. Lister's Exercitationes Medicinales.* n. 222. p. 322, 326.

22. *Medicina Statica*, or Rules of Health; originally written by *Sanctorius*; now *Englished* by *J. D. Lond.* 1676. in 12mo. n. 136. p. 921.

23. *Trichiasis admodum Rara.* *Lond.* 1684. n. 170. p. 986.

CH A P. II.

The Head.

I. *Malpighi* pretends to have discover'd, that the exterior and softer Part of the Brain, doth not cover only the *Corpus Callosum*, but is also inserted into it in many Places; that the *Corpus Callosum* is nothing but a Con-texture of small Fibres, issuing from the *Medulla Spinalis*, and terminating in the said exterior Part of the Brain. And these Fibres, he saith, are very manifest in the Ventricles of the Brain of Fishes. He pretends, that as half, or at least a third, of the Blood of an Animal is convey'd into the Brain, where yet it cannot be consumed, the finest *Serum* of this Blood is filtrated through the exterior Part, and then, entring into the Fibres of the Brain, is thence convey'd into the Nerves; which he affirms to be the Reason, that the Head is so often found full of Water, when the Brain hath received a Wound, or an Alteration by some Distemper.

Discoveries concerning the Brain; by S. Malpighi. n. 27. p. 491.

II. 1. Here was lately produced an Infant come to Maturity, having instead of a Head and Brains, a Mass of Flesh like any Liver, and was found to move. This Fœtus occasion'd a Question for the *Cartesians*, How the Motion could be perform'd, and yet the *Glandula Pinealis*, or *Conarium*, be wanting; nor any Nerves visible, which come from the Brain. The Marrow in the Spine was of the same Substance. It liv'd 4 Days and then dy'd.

A Living B'rb without a Head, at Paris; by M. n. 26. p. 480.

2. In Nov. 1673, I was called to a sick Woman, brought to Bed that very day I went to see her. After I had prescrib'd the Physick I judg'd necessary for the Mother, I ask'd for the Child, which dy'd, I heard, as soon as 'twas born. The Body of it appear'd outwardly very well formed, and very Fat; but the Head was so deformed, that it frighted all that were present. It had no Front; the two Eyes were on the top of the Face, very big, and almost without any Orbit to lodge them in. The upper and hind Part of the Head was Red like coagulated Blood, and resembled the bottom of

A odd Fœtus without a Brain; by M. Denys. n. 99. p. 61572.

a Calf's-Head when cut and severed from the *Vertebra* of the Neck. I had the curiosity to examine this Red Flesh, and I found under it a Bone, that was not a hollow Scull, but a Solid Bone in the form of a small Oyster. I had it opened every way, but I found no hollowness nor *Brains* in it. This Bone was only fasten'd before to the Bones of the Face, and not behind to the *Vertebra* of the Neck; so that the Marrow of the Back-bone had no communication with the Head. I pursued the Optick Nerves, and lost them in this Bone, which was in lieu of the *Cranium*, and was not at all spongy, but very hard. It seems to me somewhat extraordinary, that a Child should be able to live Nine Months without *Brains*; for I was inform'd, that it was very lively and brisk in the Mother's Belly, but dy'd as soon as it came into the Air.

A Child born
Alive without a
Brain; by M. Le
Duc n. 226. p.
457.

3. 1. Apr. 3. 1695. I was called to a Woman aged about 28 Years, 6 Months and a half gone in her third Child, who fell from a Stair about 8 Days before; and I happily delivered her of a Male-Child that lived half an Hour. He was big and strong, and all the Parts of the Body well proportioned, as they ought to be Naturally, except the Head, the hinder Part whereof was flat, as if it had been taken off with the stroke of some Weapon, even to the *Os Sphenoides*; there was neither *Brain*, *Cerebellum*, nor *Medulla Oblongata*: the Cavity which ought to contain these was very superficial; I found in their Place, a Black and livid Substance, covered with a Membrane, which may be the *Dura* and *Pia Mater* joined together; this Substance had coloured the *Os Petrosum* and other Bones of a deep Red Colour. I thrust a Stiller, or Probe, into the Cavity of the *Vertebres*, where ought to be placed the *Medulla Spinalis*, but found no Opposition; for, in Effect, it was filled with a Red stinking Liquor, contained in the Membranes of the *Medulla Spinalis*. The Visage of this Child was a little deform, because of the want of the *Cranium*, which might have been communicated to the Bones, as yet tender, that sustain'd the Skin of the Face. The Eyes were in great Motion during the time it lived; but we found nothing in the Place of Muscles and Nerves but Skins and Filaments very small, and not capable of Contraction, mixed in a rotten Humour, so that this great Motion might rather proceed from the Motion of the *Palpebrae*. There have past under my Hands 3 Subjects like unto this all Male, and who lived some time.

By Dr Ch. Pre-
non. *ibid.* p. 439.

2. I was present when this extraordinary Child was Dissected. We found the external Parts all well proportion'd, except that it wanted the *Cranium*, *Cerebrum*, and *Cerebellum*; the Visage was a little deform, it had Eyes and Ears like a Monkey, and all over the Body was more Hairy than ordinary. In the Place of the *Brain* we could discover nothing but a Substance like congealed Blood, covered with a Membrane; and instead of the *Optique Nerves* we only found some small Filaments.

But, this *Examen* not being satisfactory to me, I carry'd the Subject to M. Du Ferney, Professor of Anatomy in the Royal-Garden at Paris. He trac'd the 8th and 9th Pairs of Nerves and *Intercostal*; and, having cut up the Canal of the *Vertebres*, discover'd the *Medulla Spinalis* all along the Cavity, and traced all the *Vertebral Nerves* proceeding there from; as also the

Sciatick

Sciatick Nerve considerable enough. It is true, the *Medulla Spinalis* was not here of that Consistence as in Adult Persons; but one could with some pains observe all the 4 Tunicks, and the two Substances as in the *Brain*, to wit the *Cortical* or Glandulous Substance, and the *Fibrous* or white, but with this difference, that the brown Substance is exterior in the *Brain*, but interior in the *Medulla Spinalis*, for it is as it were a 3d *Brain* contained in the Canal of the *Vertebres*, so framed for its Defence; for there are *Meninges* as in the *Brain*, Sinus's and Cavities, which may pass for *Ventricles*: In a word, one can say all of it that they can of the *Brain*, and more, for it appears more sensible and necessary for the Life, for you can take the *Brain* or *Cerebellum* from an Animal, and yet the Animal shall live some time hereafter; but a Wound or Compression of the *Medulla Spinalis* will cause sudden Death. This is confirm'd by several Anatomical Experiments. 1. M. DuVerney, 1673, took the *Brain* and *Cerebellum* from a Pigeon, and in Place thereof filled the *Cranium* with Flax, notwithstanding which it lived some time, searched for Aliment, did the ordinary Functions of Life, and had the use of Sense. 2. M. Cbirac, Professor of Anatomy at Montpellier, took the *Brain* from a Dog, yet he liv'd some time, but, when the *Cerebellum* was taken out, he dy'd immediately; but he has observ'd, that, by blowing into the *Lungs*, the Animal has liv'd an Hour, although wanting the *Cerebellum*. 3. He took from another Dog half of the *Cerebellum*; but he dy'd immediately. 4. After he had taken half the *Brain* from a 3d Dog, the Dog continued to have the Motion of all the Parts, and could walk about; and, even after he had taken away all the *Brain*, he had yet Sense and Respiration. He separated the *Medulla Oblongata* of a 4th Dog from the *Medulla Spinalis*, by introducing a pair of Scissars between the first *Vertebre* and the *Os Occipitis*; the Dog had dy'd immediately, but by blowing into the *Lungs*, the Motion of the *Heart* continued, and the Animal could move his Body. 6. He took the *Cerebellum* from a 5th Dog; but he lived 24 Hours, and his *Heart* beat well.

All these Experiments let us see, that an Animal may live some time, tho' imperfectly, wanting the *Brain*, and even the *Cerebellum*: but there is no Experiment where ever they lived wanting all. Therefore I humbly conceive, the *Medulla Spinalis* was not here wanting, for it has here supplied the defect of the *Brain* and *Cerebellum*, and the Animal Spirits have been separated and distributed for continuing the Circulation of the Blood. For 'tis to be considered, that although the *Intercostal Nerve* and *Eighth Pair* have their Origine in the *Medulla Oblongata*, yet after their Entry into the Cavity of the Breast, they are united with Branches from almost all the *Vertebral Nerves*, and with them make up several *Plexus's*, and from those *Plexus's*, several Branches are emitted that go to the *Heart*, and other Parts, sufficient for the continuing the Circulation of the Blood; which has occasion'd some to run into a Mistake, thinking the Circulation is to be explained some other way, than by the Influx of the Animal Spirits into the Nerves, which they endeavour to prove by an Experiment on a Dog, of tying the *Intercostal* and *Eighth Pair* of Nerves, before they enter the Cavity of the Breast, and yet the Dog shall live 2 or 3 Days thereafter.

But, except they can tie all the *Vertebral Nerves*, or at least tie the *Nerves* at their Entrance into the Heart, their Experiment is not so convincing: And the Symptoms which ordinarily happen, even upon tying the *Intercostal* and *Eighth Pair*, is an evident Proof of the contrary, for the Animal is taken immediately with *Convulsions*.

I shall not pretend to determine after what manner this want of the *Brain* was supplied, or whether the *Brain* and *Cerebellum* were carryed off by the strong force of Imagination, or by some Accident, or Corruption: But, whatever of these obtain, I am apt to believe that all the Parts of this *Fetus* were once entire, and perfectly framed. And the tracing of the 8th and 9th Pair of *Nerves* and *Intercostal*, which take all their Origine from the *Medulla Oblongata*, seems to be a Proof of it; and how far the force of Imagination goes, and what influence it has upon Children, we have several Instances. We have also several Observations of like Cases with this Infant, delivered to us by M. Mauriceau, and M. Pen, and other Authors.

An Infant with
the Brain de-
pressed into the
hollow of the
Vertebrae of the
Neck; by Dr.
Edw. Tyson. n.
228. p. 533.

4. Some Years ago, I was called to see a Birth which was very surprising; The Midwife informed me, that the Child was alive, but dy'd in the Birth or a little before. I found it well grown; all the Limbs and Body well proportioned, and plump; the Face well Featur'd, only from the Eye-brows, the *Skull* was perfectly depressed down to the *Os Sphenoides*, or Basis of the *Calvaria*; so that it had no Forehead at all. I open'd the *Cranium* in several places, before I could find any *Brain* at all; but at length I observed, near the passing out of the *Medulla Oblongata* to the *Medulla Spinalis*, a small quantity of the *Brain*; the whole might be included in a Walnut-shell: It was covered over with a bloody Matter. But, thrusting down my little Finger thro' the *Foramen* where the *Medulla Spinalis* passes, I observed a very large Cavity in the hollow of the *Vertebrae* of the Neck, so that I could turn my Finger round a good compass there. This large Cavity I found to be filled with a Substance like the *Brain* or *Medulla Spinalis*, or both: but far larger than the *Medulla Spinalis* it self could be in so small an Infant. This easily made me to conclude, that the *Brain* must be pressed down hither, which I was the more induced to believe, because the Mother informed me, that, when she was with Child, she received a considerable bruise in her Belly.

How far the *Medulla Spinalis* may answer the Office of the *Brain*, especially in the Embryo's, where there is no exercise of the Senses, nor the Imaginative Faculty, will be no great difficulty to apprehend; since, for the Functions of Life in them, the Spirits generated even in the *Medulla Spinalis* (for it has a Glandulous Substance too, but inwards) may suffice: especially in this Instance, where I do suppose a great Part of the *Brain* to be detruded (by the bruise the Mother received) into the hollow of the *Vertebrae*: And do Quære, whether in those Instances that are given of Births of Infants without *Brains*, there might not be the like Accident of the *Brain*, or the principal Parts of it being depressed into the *Vertebrae*; which in Embryo's (before hardned into Bones) are Parts extendible.

A Child born
without a Brain;
by M. Buffiere;
n. 251. p. 141.

5. In Oct. 1698, a French Woman, living at *Dunghill*, of a good Complexion, and in perfect Health during all the time of her being with Child, was brought to Bed of a Boy: He was Tall, well shaped, and very sound.

And

And, tho' it be uncertain whether he was born alive, yet the Mother assured me, that she felt him stirring an Hour before, and indeed the good Condition of his Body sufficiently proves that he was alive. The Skull was unequal, and the Skin thereof, though full of Hair, a little redder than the rest of the Body. The *Coronalis* Bone laid flat upon the *Sphænoides* Bone, which made the Eyes look as if they had been placed in the top of the Forehead. The *Squamosa* Part of the *Temporal* Bones was wanting, there being but the *Os Petrosum* which was in its natural Place, and in which were the Organs of the Sense of Hearing in very good Order. There were no *Parietal* Bones, nor any thing equivalent. Of the *Occipital* Bone there was but the Basis which joyneth to the *Sphænoides*, in the middle whereof was the great Hole through which the *Medulla Oblongata* commonly passeth, all the Upper Part of this Bone being wanting, without any mark of having been corroded or gnawn, the edges of which were very smooth. All the upper Part of the Bones of the Skull being wanting, the Skin had no other support but its Basis; which was the reason why the Top of the Head was very unequal and rough. No Brain at all was found, nor any Mark in the whole extent of the Skull, that there had been any, there being no Space left between the Basis of the Skull and the Skin to contain it; there was no *Dura Mater* neither, the Bones being covered only with a very thin Membrane. Neither the *Carotides*, nor the *Vertebral* Arteries did penetrate the Skull, but by small Twigs, spread in the thin Membrane. The Beginning of the *Medulla Spinalis* was under the 4th *Vertebra*, like a small Stump wrapt up in the *Dura Mater*; the *Medulla* was very sound, and of the usual bigness; and all the *Nerves*, which parted from it, were in their natural Order. The Eyes were well shaped, and all the Parts belonging to them in their natural Situation: But all the *Nerves* did terminate themselves in the Holes of the Skull, through which they commonly pass; they did reach no further, nor had any Communication with any other. The Tongue was very fresh, and doubtless had performed the Deglutition to make the Child swallow the Colliquamentum, of which there was a good quantity in the Stomach. The *Larynx*, and all the Parts of the Throat, were as the rest of the Body, in a good Condition.

6. Dec. 12. 1688, I was desired to be present at the Opening of Mr. A. About 2 Months before, he had received, in a Quarrel, a great Bruise on his Head. After some time he took his Bed; and complained of a most violent Pain in his Head. He sometimes Vomited; sometimes was in *Convulsions*; sometimes in the Day he would have a great *Stupor* upon him; and, when he waked he would be Delirious. His Swallowing was difficult, and he would grind his Teeth: His Eye-sight afterwards failed him, and he lost his Memory; and, upon the least Motion of his Body, would faint away, and in the whole course of his Distemper was Feverish. Upon opening his Head, I observed the Blood-Vessels of the *Meninges* very much extended, and the greatest Part of the left *Hemisphere* or side of the *Cerebrum* or Brain to be perfectly rotten or Sphacelated, not having the least Consistency, but Purulent and soft: Nor could I distinguish the *Medullary* Substance from the *Cinereous*; but all of a dark reddish Colour. In the Ven-

One Hemisphere of the Brain sphacelated, with a Stone in it; by Dr. Edw. Tyson. n. 228. p. 535.

tricles of the *Brain* I observed a great deal of Water: And upon Dissecting the *Protuberantia Orbicularis*, called the *Testis*, on the Left side, which was as big as a Nutmeg, I found in a Purulent Matter there a Chalky Stone, about the bigness of a Cherry-stone, but flat, and not very thick; and in taking it out I found it friable.

An Hydrocephalus; by Mr. J. Friend, n. 256. p. 318.

III. The outward Dimensions of this Head, before it was opened, were as follows; *viz.* From the *Eye-brows* over the Crown to the Nape, 23 Inches; the Circumference from the Nape round the *Ossa Bregmatis*, 26; but round the *Os Frontis*, 24; from Ear to Ear, over the Crown, 19; from the *Eye-brows* to the Chin, 4; from one extremity of the *Eye-brows* to the other, $4\frac{1}{2}$; from the Chin to the *Coronal Suture*, $7\frac{1}{2}$; Circumference from the Chin round the Crown, 30; from one extremity of the Ear backward to the other, round the Nose, 12; and round the Nape, $6\frac{1}{2}$; from Temple to Temple over the Forehead, 11; Circumference of the Head round the *Os Frontis* and *Occipitis*, 29; Circumference of the Neck, $9\frac{1}{2}$; Length of the Neck, 2; Length of the Body, 33; Circumference of the Thorax, 18; Length of the Foot, $4\frac{1}{2}$; from the middle Finger's end to the *Acromion*, $12\frac{1}{2}$; Circumference of the Arm, 5; of the Calf, $5\frac{1}{2}$, of the Thigh, 8.

After the Integuments were removed, the top of the *Cranium* appeared soft and membranous; the Extent of the Membrane from one Temple to the other was 8 Inches; between the *Parietal Bones*, $3\frac{1}{2}$; from the *Os Frontis* to the *Os Occipitis*, 12. In the middle just upon the Crown lay a Bone (in some places a little Cartilaginous) 5 Inches long, and 1 broad, joyned to the Membrane on every side; of the same thickness with the rest of the upper Part of the *Cranium* that was Bony, which was extremely thin every where, and the *Laminae* lay so close, that in many Places no *Diploe* could be discern'd. The Membrane was as thin as the *Pericranium*, which yet was easily divided from it. None of the Sutures were entirely closed, those of the upper Jaw very loose. In the *Temporal* and *Lambdoidal* was an infinite number of the *Triquetra Wormiana*, all which had so many distinct Sutures. Upon piercing the *dura Mater*, a great quantity of Water flowed out; it lay as well between the *Dura Mater* and the *Pia*, as in the *Ventricles* of the *Brain*. The Liquor was thin, pale, and insipid; there were taken out 5 Quarts of it. The *Dura Mater* was firm and entire, of its usual thickness, and stuck very close, as well to the Membranous, as to the Bony Parts of the *Cranium*. All its Processes and Sinus's were singular, the 4th Sinus somewhat larger than ordinary. A very large Vein of the *Dura Mater* entered the *Longitudinal Sinus*, directly forwards towards the *Crista Galli*, contrary to the Course of the Blood. The *Pia Mater* was very much distended, and seem'd to be stretched as much as it could bear. It lay smooth and equal upon the surface of the *Brain*, there being neither any Circumvolutions in the *Brain* for it to go between, nor any Partition to the *Corpus Callosum*, tho' there was a large *Falx* in the *Dura Mater*. The *Lateral Ventricles* were very thin: towards the *Cerebellum* their upper Part was quite wasted, so that nothing was left to cover the Cavity in that Place but the *Pia Mater*. This was so thin, that

in

in slooping down the Head to empty the Water, it broke and hindred us from knowing exactly how much Water the Lateral *Ventricles* contained; but by their Cavity, which was very large, one might guess they held, at least, a Pint each. The 3d and 4th *Ventricle* had some little Water in them, but were scarce larger than usual. The *Brain* had all its Parts plain and entire, tho' its Substance in most Places was but very thin and loose: About the *Corpora Striata & Thalami Nervorum Opticorum* it was tolerably thick, and firm enough, tho' nothing to what it is in a Natural State. The *Cerebrum* and *Cerebellum*, when laid out in their right Position, were 11 Inches long; the *Cerebrum*, cross the Lateral *Ventricles*, 9 broad. After all the Water was taken out, both of them weigh'd $1\frac{1}{2}$ l. The *Corpora Striata & Thalami Nervorum Opticorum* were very small in all their Dimensions; withinside towards the *Ventricles* they were wrinkled and lay in folds, like those in the inner Coat of the Stomach. In the *Corpora Striata* there were no *Striae* discernable. The *Plexus Choroides* were very small; the *Glandula Pinealis* was somewhat bigger, but less compact than ordinary; the *Nates* were red and large, 2 Inches long, 1 broad, and 1 thick; the *Testes* were not distinguish'd from them by any Protuberance, they seem'd rather to be a Production into which the *Nates* less'n'd by degrees, like a Sugar-loaf. The *Cerebellum* was very firm every where, and did not much exceed its Natural Bulk. The *Medullary Trunk*, which sends out those little Branches like Trees, was thicker and harder than usual; the Branches were not so much disposed like those of a Tree, but went rather in single oblique Lines, like so many Rays drawn from a Point. The *Nerves* were all Regular and plain; only the *Olfactory* were very small; the *Optick* did not joyn before they entered the Orbits. The *Rete Mirabile* was very large, so was Dr. Ridley's Circular *Sinus*. On the Right side were two *Carotid Arteries* (the *Intercostal Nerve* lay between them) they entered the Scull at the same Hole. The Trunk of the *Vertebral* (where those Arteries unite) was extreamly big and full of Blood. The Veins were neither larger, nor more, than usual. Upon the *Brain*, over the Lateral *Ventricles*, I could easily discern 3 or 4 *Lymphaticks*, but they were too small to be traced.

The Mother of this Child brought it to Oxford for a Sight. She said, she was 3 Weeks in Travail, and at last was forc'd to have the *Vagina* ripp'd for its Passage. The Child was 2 Years and 6 Weeks old, it could speak a little, could not go, nor hold up its Head; 'twas always Merry, never subject to Drowsiness, Pain in the Head, want of Appetite, or Indigestion: Its Sight was somewhat dim, and its Smelling but dull. It never had any Illness, only 2 or 3 Days before it dy'd 'twas very much troubled with the Gripes, and, upon opening the *Abdomen*, the Guts were found extreamly swell'd with Wind. Every Thing else was as it should be.

IV. Illustrissima Domina N. à multis retro Annis *Hypochondriacis* (prout vulgo dicuntur,) & *Hystericis* laboverat Symptomatis; quibus aliquoties, at nuperis Annis, supervenerat Narium Hæmorrhagia profusa. Ad periculum & à Morbis & ab Hæmorrhagiâ averruncandum *Plebotomia*, inter alia præ-

The Dissection of a Lady, who dy'd of an Apoplexy; by Dr. Will. Cole. n. 173. p. 1068.

fidia,

fidia, sæpe in subsidium vocata fuerat. Pridie vero ejus Diei, qui illi supremus erat, ad Hæmorrhagiam solitam proclivis erat, quam omni Ope sub ipso erumpere gestientis Sanguinis primo Nixu prævenire satagebar, Periculum, quod non multo ante ab immodico ejus Effluxu evaserat, iterum verita. Et quidem nimis fataliter cessit Remediorum quæ adhibuit successus, Sanguine non amplius prodeunte; unde se in tuto positam, vel eo ipso ante obitum die, *Maij 10, 1679, censuit.* Cum ex improvise fatalis illius immineret Catastrophe. Postquam enim Vesperi se intra Cubile composuerat, subito immani Capitis Doloze correpta erat; cujus gratia (vacillare statim incipienti Lingua) Chirurgum exemplo advocari jussit, qui sanguinem detraheret. Ille autem, qui Mille Passus inde aberat, non ante appellere potuit, quàm Nobilissima Domina è Vivis excesserat, quod intra Semihoram ab insultu contigit.

Ad Cadaveris Apertionem vocatus, accito in operis Societatem Doctiss. *D. Tomkyns*, hoc notatu dignum invenimus, quòd quamvis à 30 annis *Fecur* ab omnibus fere Celeberrim. Medicis, quos sanitati suæ moderandæ admoverat, non modo summe obstructum (quæ etiam de *Liene* pronunciata fuerat Sententia,) sed etiam Scirrhusum habitum fuerat, usque adeo tamen ab omni labe immune erat, ut nulla vel minimæ Obstructionis Vestigia offendi potuerint. Solummodo prægrande erat, & proinde (in Macilento præsertim Corpore,) majorem solito in Hypochondrio Tensionem efficiens, palpum iis facile obtrudere potuit, qui, pro solenni olim more, cunctorum Hypochondriacorum Titulo insignitorum, Symptomatum ab *Hepate* & *Liene* Obstructis deducunt. Hoc saltem notavimus, quod nec in *Cysti Fellea*, quæ plurimum contracta erat, nec in reliquis (quæ sese conspicienda obtulerunt,) per *Hepar* sparsis Vasis Biliariibus, quicquam Bilis repertum fuerit, nec ab eâ Tincturam nisi admodum dilutam, hauserant; verum in *Cystis* Cavitate quatuordecim reperiabantur Concretiones, quarum maxima pars magnitudine pisa æquabant, quæ vel tres paulo ampliores erant, pressæ rotunditatis, exterius fere nigricantes, & Glabræ, arque Bezoar, postquam paululum Aeri expositæ fuerant, æmulantes, primo autem intuitu Pilulas Aloeticas referentes, intus Flavescences, cum aliquali in Centro Cavitate, facillèque Friabiles. *Lien* pariter ab omni labe immunis videbatur, sed non secus ac *Hepar*, solito grandior. *Pancreas* nulla evidentia Obstructionis indicia prodebat. *Renes* & Sabulo, & Calculis, omnique Obstruente Materiâ liberi erant, quantumvis præ Doloribus, qui circa eorum Regionem aliquoties invadere solebant, crediderat aliquando Illustr. Domina, se *Calculo* laborasse. *Uterus* debite constitutus videbatur, quamvis ex Symptomatis, quibus antea laboraverat, haud pauca huic parti adscribi soleant.

Intra *Thoracem*, observandum occurrebat, quod in dextro Latere *Pulmones* firmiter *Pleuræ*, & Digitorum Latitudine, adhærebant, variisque in Locis, præsertim hic illic circa Loborum Margines, tanto Nigrore afficerentur, ut ad Sphacelationes Proni viderentur. Cor sanum conspiciebatur: Quòdque forsan attendi mereatur, Pinguedinis sat magna quantitas *Basi* ejus accrevit, quanquam reliquo corpore valde emaciata fuerit.

Aperto Cranio, Vasa Sanguifera Membranas (*Tenuem præsertim*) dextri Lobi *Cerebri* prerreptantia, Sanguine admodum turgebant; iisque ex illa *Cerebri* regione, (quâ se laborare statim ab invasione conquesta est,) discissis, magna effluxit serosi Sanguinis quantitas, quo evacuato, *Cerebrique* Substantia cultello aperta, sese in conspectum obtulit largus concreti Cruoris grumus, qui Stateræ impositus pependit Unciam circiter cum dimidia, atque proinde largam illic sibi necessario formaverat cavitatem: ast in *Ventriculos*, vel alibi inter Membranas, nil omnino Sanguinis effusum erat. Sinistrum Lobum quod attinet, nec ille, nec ejus Vasa Sanguine supra modum turgebant. De Cætero, nil in properâ isthac, quam Lucernarum Ope adornabamus, Dissectione (nempe festinandum erat) comperire potuimus, unde concludendum esset *Cerebrum*, quantum Oculis patuit, male affectum esse; tametsi ex variis Symptomatis quibus à longo tempore obnoxia fuisset Nobiliss. D. (utpote *Cordis* Tremore, & Palpitationibus, magnis Anxietatibus, Musculorum in Artubus aliisque partibus contracturis & Doloribus, aliisque pluribus *Convulsivis*) non levis Momenti Argumenta Succi Nervosi haud parum Vitiati desumi potuerint. Unde Corollarium isthoc forsan deducere liceat; Succorum in Corpore contentorum Vitia non semper partium vel Continentium vel Secernentium culpæ, sed quandoque (si non plerumque) propriæ eorum Degenerationi & Dyscrasiæ imputanda esse. *Cerebrum*, cum *Cerebello* *Cranio* exemptum, & superfluo, quæ licuit, Sanguine liberatum pependit 2 l. 14 Unc. *Averd.*

V. The Incomparable *Malpighi*, who industriously apply'd himself to very serious Studies, was of a good Habit of Body, and had seen 66 Years; but he had frequent Sicknesses; sharp Vomitings did torment him for 20 Years; he was troubled with the Gravel, a Hæmorrhagia in the Kidneys, a Rheumatism Fluxious; which with their troublesome Consequences, augmented his Infirmities. Scarce had these Evils given him some respite, when a cruel Palpitation of the Heart, with an unequal Pulse came upon him. Moreover 4 Years before his Death a sharp and biting Sweat fail'd not, all the Summer, to trouble him every Night. Pope *Innocent XII.* having call'd him to *Rome* to make him his chief Physician, he began the first Year to lose his fresh Colour; in the second, he voided many Stones without much Pain; and in the third, which was the last of his Life, he found himself oppress'd, during the Winter, with a Difficulty of Breathing.

His Health being thus insensibly undermin'd, and a Bilious Loosness returning ever and anon, he was at length seiz'd with a *Vertigo*, a loss of Speech, and a Contorsion of the Mouth, (*Spasmus Cynicus*) and a Palsy of half the Right-side. And tho' there was Appearance that he was out of danger by Bleedings, Purges, Diureticks, and Antapopleck Medicines, yet one might see, by his Melancholy Countenance, but especially his want of Memory, that there was lodg'd in his Brain some Melancholy Humour. Therefore perceiving his End drawing near, he sign'd with his Hand 3 Days before his Death, his Posthumous Works, which he had order'd to be deliver'd to his Collegues of the *R. Society* at *London*.

Then

The Death and Dissection of S. Malpighi; by Jean Marie Lancisi. n. 226. p. 467.

Then, having confess'd himself with great Humility, he attended generously, and with Faith in God, the Death which appear'd to him certain, and not far off. And on the 28th of Nov. 1696, a terrible *Apoplexy* finish'd, in the Space of 4 Hours, this so precious Life.

This Learned Man foresaw that he should end his Days by an *Apoplexy*, and therefore forbad his Friends to open his Body till 30 Hours after his Death, for he knew well enough, that some who seem'd dead on a sudden have reviv'd some Hours after. When he was open'd, we found the Bladder of Gall abounded with a black Gall; the Left Kidney had nothing amiss; but the Right was twice as little, and had its *Pelvis* thrice as big; which discover'd the Cause of the easy Descent of the Stones. We found in the Bladder a little Stone that seem'd to have fallen into it a few Days before. The Lungs appear'd wither'd, with some mark of Corruption on the back-side. The Heart was bigger than ordinary, and the sides of the Left *Ventricle* felt harder and thicker in some Places than others; yet there was no *Polypus* found in it.

The *Right Ventricle* of the *Brain* contain'd almost two Ounces of extravasated Blood, and the *Left Ventricle* was swell'd with a thick and yellow sort of Phlegm, which weigh'd more than an Ounce. Moreover the *Dura Mater* stuck closer to the *Skull* than is usual. This proves, that the *Conglobated* Glands in the whole Body had thrown into the Mass of Blood an Acid Lymph, and that the *Conglomerated* Glands of the *Hypochondria*, especially those of the Liver, had thrown into it a Melancholy Humour, and that these two Sorts of Humours, being carried into the Vessels of the *Brain*, had dispos'd the Blood to coagulate there, and that having there corroded and broken the *Tunics*, which serv'd for a stop to them, they had run into the Cavities, where they caus'd Death without a Remedy.

The Dissection of
a Boy, who dy'd
suddenly; by D.
Cha. Freston. n.
224. p. 362.

VI. Being call'd to the Dissection of a Boy, about 9 Years Old, who died suddenly, being taken ill with a Fit of Vomiting a little before his Death, we discover'd the Left *Testicle* out of its natural Place, drawn up above the *Aponeurose* (or Holes of the 3 Muscles of the *Abdomen*, which give passage to the Spermatick Vessels in Men that go to the *Testicles*, and to the round Ligament of the Matrix in Women,) the Bladder was extremely distended and full of Urine; in the Stomach we found a Worm of about 9 Inches in length, and a Line and a half broad, as also a kind of slimy Matter; the Liquor contain'd in the Stomach was black, but perhaps it might have that Colour from some Remedies prescrib'd against his Vomiting. The Lungs were ty'd to the *Pleura* on the Right-side, but were free on the Left; in the Left there was an Inflammation of the *Pleura*, with some Matter; as also an Inflammation of the External *Tunic* of the Lungs. In the Left *Ventricle* of the Heart we found a large *Polypus*, which fill'd the *Vena Pulmonaris*, and enter'd the Left Auricle, about 8 Inches in length, and two Fingers broad. In the Right *Ventricle* there was also a *Polypus* of about an Inch in length, which was so big that it almost stopp'd the Entrance of the Blood into the *Vena Cava Ascendens*. Lastly, In the
Brain

Brain we found also a considerable *Polypus*, in the *Sinus Longitudinalis*. other Things were according to Nature.

VII. I had a Gentlewoman my Patient, who was much troubled with the *Falling-Sickness*; In her Water I saw a great Number of short Worms, full of Legs, and like *Millipedes*: I gave her two or three Purges, first with *Pil. Agaric.* and *Rhubarb*; but I still perceiv'd, in every Water was brought me, 8 or 10, or more of the Worms; they appear'd lively and full of Motion; and the Fits continu'd daily. At last I gave her half an Ounce of *Oxymel Helleboratum* in Tanfy-Warer, which wrought well, and was successful; so that she had a compleat Cure.

The Falling-Sickness; by Dr. Turberville. n. 167. p. 839.

VIII. In Aug. 1687. I was desir'd by a poor Woman, at *Astrop-Wells*, to look on her Daughter. They came from *Stow* in *Gloucestershire* (as they had often done before) for Work. The Daughter was about 21, of a Sanguine Complexion, and as to private matters well enough: She had been for several Days less active than usual; and after that, had (a Week before I saw her) lost her Speech, and the use of her Legs; she had little or no sense of Feeling in them, and the Left Leg was drawn up as in a violent Cramp. Her Ruddy Sanguine Look directed Bleeding; but that did not relieve her. I then gave her Spirit of *Sal. Armon. Succinated*, Steel with Gentian, Amber, Castor, and other warm Cephalicks. A Blister was laid on her Neck. A Bath (of Wormwood, and other hot Herbs) prepar'd for her Legs; *Ung. Mariatum* used to anoint them after Bathing. By these Means, she was, in the space of 3 Days, able to speak again; and in a little time, by the help of Crutches, able to go. But then omitting the Medicines, tho' but one Day, she lost her Speech again; and returning to them (especially the Spirit) recover'd it as soon. When not able to speak, she had a manifest Alteration in her Face; the Strength and Tonick Vigor of it abated; her Eyes grew dull, her Lips pale. I have, in this Juncture, given her 30 Drops of the Spirit: In the space of two Hours the Change has been surprizing; her Eye has quicken'd, a Colour come over her Face, her Speech return'd.

A Periodical Palsy; by Dr. Will. Moulgrave. n. 242. p. 257.

In July 1688, her Mother brought her to me again, and told me, That after the Physick, I had (the Year before) prescrib'd her, was all spent, her Speech, and the Use of her Legs left her first in September, on a Tuesday about Noon, and return'd the Saturday following near the same Hour; and that from Michaelmas to the Time of our Discourse (which was July 18, following) her Speech and Strength of Legs observ'd the same Period (of going off on Tuesdays every Week, and returning on Saturdays) with only two Exceptions, viz. That once they return'd on a Friday, another time not before Sunday. She added, That her Daughter was, the preceding Winter, very weak, and in danger of Death; that her Appetite was much abated; that she sometimes chose to eat Bread, Water and Salt, boil'd together, that now, as the Summer came on, she recover'd some Degree of Strength; that she had lost no Sense at any Time, besides that of Feeling; which was by the first

Quantity of Medicines restored effectually, and without Relapse. That the Menfes were regular as to Period, but as to Quantity unequal, and that when they were most she was worst. That before her Speech us'd to go off, she constantly lost, for an Hours space, the use of her Left Arm; that when her Speech was leaving her, she would stammer out some few Words, and after this, on a sudden, became mute: And that when not able to speak, she often moaned, and made a melancholy complaining Noise; that her Speech did use to return (as it went off) all on a sudden, and at once. She always had, as her Speech ceased, and two Hours after it was gone, a Pain in her Left-side, including Arm and Leg; her Left-Foot was then drawn up, as before-mention'd: Her Face was high-colour'd when she lost her Speech, pale when it return'd: No Part of her Body wither'd, but the whole generally Cold. Some time before she was at first struck Speechless her Hands used to tremble, but have been of late more steady: Nor was she now so dull and heavy as formerly; but, for the Generality, more brisk and chearful than in her State of Health. When she has her Speech she goes best; but is always forc'd to use a Stick, being never able to go steadily: She speaks by Intervals as distinctly as ever, and as loud; can sing, when capable of speaking, but at no other Time.

I found, that the Mother sometimes had *Convulsive* Fits; and though a poor labouring Woman, was extreamly *Hysterical*. And I observ'd the Daughter to have a pale sickly Look; a heavy Eye, a low Pulse; and to be much wasted in Flesh. She continu'd in my Neighbourhood about 2 Months, and I saw her almost every Day for the whole Time. I then repeated the former Course, furnishing her with large Quantities of her old Medicines; and so dismiss'd her, with Orders to let me hear again from her, when the Physick should be all spent. Accordingly, in Sept. 1688, she came (with her Mother) from *Stow* to *Oxon* (that is almost 20 Miles) on Foot. I gave her a further supply of Medicines, and by the 10th of Nov. following she was grown strong, and to all Appearance as well as ever. For two Months, then last past, she did go and speak every Day, but not at all Times, of the Week; for her Speech left her (as formerly) on *Tuesdays*, but (now) return'd the next Day after Noon. Thus she continu'd to the Summer following; not speaking (in more than 20 Months) on any one *Wednesday* Morning.

In the *Summer*, 1689, Hoping to compleat the Cure, I procur'd for her a large stock of Medicines for the Winter following; but from that Summer, to this of 1698, I have heard nothing of her.

There were some of Opinion, that this young Woman counterfeited; but upon strict Examination, I could never find any Reason for that Suspicion: And I beg leave to say, I think it was not in her Power so to do.

See odd C. moul-
den in the Cheek;
by Dr. Dawbeny
Turberville. n.
164-p. 737. IX. A Man came to me, who had a long Time been troubled with a great Pain, and *Convulsions* in his Cheek; you might cover the Place, where the Pain was, with a Penny: The *Convulsions* pull'd his Mouth, Face, and Eye aside. I apply'd a Cupping-glass to the Place: then I Scarify'd,

Scarify'd, and Cupp'd him again; after which I put on a Plaister of *Dia-
palma*, and he was perfectly Cured.

X. Acri erat & lepidio Ingenio cujus casum refero Domina, formosa, *Ευταρκης*, interque Negotia domestica, quæ continuo eam exercitam detinu-
erunt, plurimum occupata, unde integra per multos Annos Valetudine
potita est, plures licet enixa fuisset Liberos. Ante Sexennium vero abhinc
prægnans, circa medium Gestationis tempus, in *Hystericos* (nescio qua
περὸς) incidit Affectus, qui quamvis illo tempore Remediis cedebant,
subinde tamen recurrebant, licet non admodum frequentes. Tandem in-
stante Partus tempore, postquam magis quam par erat (gravi id postulan-
te Occasione) sese exercuerat, postridie (accelerato forsan aliquantulum
Partus tempore) cum Maximis doloribus partuire cœpit, magna effluente
Sanguinis quantitate, Foetu tamen nondum in Lucem emisso; donec la-
bantibus viribus totoque fere, prout astantibus visum erat, excreto San-
guine, de Vita desperatum fuerit. In Vitam vero quasi revocata (Foetu
tandem, sed mortuo, excluso) brevi in *Convulsivos* incidit Affectus, qui,
non obstante Remediorum usu, pertinaciter affligebant, per Intervals li-
cet ad plures Menses. Inde aliquanto melius se habuit, licet non in to-
tum à prefatis Symptomatis immunis; quæ tandem cuncta, non incertis,
ut ante, Invasionibus molesta erant, sed primo Tertianis, si recte teneo,
Periodis, dein Quartanis & non ita multo post Quintanis, (*b. e.* ut Qua-
tuor integri intercederent inter singulorum Paroxysmorum initia) inva-
debant; idque exacte adeo, ut non certius Horologiorum Indices ad no-
tatas figuras redeant, quam isti Paroxysmi suos repeterent Cursus. In-
cipiebant cum Oscitatione, aliquali Rigore, & magna Urinæ Limpidæ
quantitate exclusa; dein ægrotans statim *Convulsa* opus habuit ut astan-
tium manibus prehenderentur ejus manus, secus vel Vestes vel Faciem di-
lacerabat, multoque nisu Dentibus petebat prehendendum manus, Mente
omnino Capta, & Aphona. Postquam per horam unam vel alteram
hoc modo *Convulsa* perstitisset, Urinæ Limpidæ magna copia identidem
reddita, sensim evanuit Paroxysmus, obrepente Somno, qui per plures
horas perseverabat; tandemque, omnium quæ in Paroxysmo transacta
erant nescia, ad se rediit. Reliquis tribus diebus, quamvis à Paroxysmo
libera, admodum tamen debilis, & enervata erat, ut vix è lecto vel Se-
dili surgere, nedum cameram obambulare absque ministrantium Satellitio,
potuerit.

Curationem accersitus aggressus sum Medicamentis Testaceis & Sp. C.
Cervi; Indicationem sumens à magna illa Urinæ Profusione, & *Nervosi*
generis Affectibus, quæ insignem & Sanguini, & Succo *Nervoso*, Acorem
impressum fuisse mihi fidem fecerunt. Verum cum pertinaciter, his non
obstantibus, hærent Paroxysmi, statisque redirent Periodis, in Mentem
venit, istos non aliter tractandos, quam solent Febrium Intermittentium.
Quamvis enim non tantum præ se ferrent Calorem, quantum Febres
Vulgares Intermittentes; cum tamen regulariter adeo, uti mos est istius-
modi Febrium, procederent, cumque insuper non omnes Intermittentes,
proprie sic dictæ, eundem observent Caloris modum, omnes tamen eodem

Remedio, *Cortice* sc. *Peruviano*, debellentur; statui Famofissimo illo Specifico hunc Affectum aggredi, (intercalatis tamen Medicamentis supra memoratis) utpote quoniam altè mihi infederat Notio dicta de Acida Succorum Dyscrasia: Nec fefellit Eventus; postquam enim duas vel tres istius *Corticis* Doses ante totidem Paroxysmos, pro more tunc temporis (mihi saltem) solenni, exhibueram, sensibiliter ferociam suam deposuerunt; tandem continuata ejusdem Exhibitione prorsus evanuerunt, nec, quantum mihi rescisse contigit, postmodum redierunt.

A Periodical Disease of the Convulsive Kind; by Dr. Will. Cole. n. 174 p. 1115.

XI. *Dorothea Cook* Vidua, sexagenaria, *Coffepola Vigorniensis*, à 36 Annis (triduo post Nuptias) *Epileptica* nulla notabili ~~periculis~~ corripì cœpit; qui quamvis sub Morbi initium frequenter, nullo tamen ordine, recurrebant. Invasio tam subita erat, ut quæ & aliis & sibi perfecte sana videbatur, nictu oculi in humum, mente protinus orba, concidere soleret: Quo in statu, postquam velut exanimis, nullis agitata *Convulsionibus*, per aliquot horæ Minuta jacuerat; discussa tandem nebula ad se rediit. Aliquot post Menses, circa Plenilunium & Novilunium, imo sæpius in die istis temporibus, invadebant Paroxysmi, & ad duos vel tres dies recurrere perseverabant; reliquo Interlunii tempore bene habuit. Post pauculos inde Menses, qui prius duarum fere Septimanarum observaverant Periodum, tandem bis intra singulas, sed inæqualiter æquali Distantia, diebus sc. Jovis & Saturni, Cursus suos repetebant. Brevi post nuptias gravida facta est, Foetumque solito tempore peperit, qui non ita multo post *Epilepticus*, Fato functus est; Secundus item Partus eodem modo periit: Sed licet plures postmodum utriusque Sexus liberos enixa fuerit, nullus tamen eorum ad hunc usque diem vel minimum ejusmodi Affectus insultum perpeffus est.

Per tres circiter Annos memorato ordine (variis licet tentatis Remediis) Invadere persistebant Paroxysmi, donec tandem *Empirici* cujusdam plurimum decantato, nescio quo, Remedio disparuerint, nec per aliquot Menses redierunt; usque dum novi Terroris occasione (ante potius, ut videtur, sopiti quam persanati) recruduerint. Hinc ad idem Remedium iterum confugiebat: Sed quod pridem tantopere profuerat, nunc nil levaminis attulit. Nihilominus secunda vice doctissimi, perque multos Annos apud *Vigorniam* merito Celeberrimi, D. *Johnson* (nuper Defuncti) ope à Morbo brevi convaluit, atque sana perstitit adusque famosum *Vigorniese Prælium*, An. 1651, dimicatum; quando capta à *Cromwellio Vigornia*, dum ubique Mors & Horror sæviebant, ipsa (non secus ac cuncti præterea Incolæ) immani Terrore perculsa, pristinorum Insultum Paroxysmorum iterum subiit; qui exinde irregulariter primo, & frequenter invadebant, postea sensim ad veterem redibant Periodum. Dehinc varia, & à præfato D. *Johnson*, & ab aliis, usurpavit Remedia, sed ineassum omnia. Postquam per biennium inde Typo isthoc recurrere perstiterant, tandem præ Consternatione iterata diem Invasionis mutarunt, atque primum bis Hebdomadarum, tandem sola die *Dominica* (commotionis ansa isthoc die forte fortuna oblata) ad hoc usque tempus invaserunt. Cujus quidem Periodi, & Symptomatum, progressus sequenti modo se à tot Annis habet.

Die

Die *Jovis* circa Vesperam invadere incipit dolor in Vertice, nec non pulsativus circa Offis Sacri regionem, qui die *Veneris*, altius paulatim serpens, medium occupat Dorsum: Vesperae diei *Saturni* immanior evadit (multum etiam urgente Siti) & pauculis, postquam se in lecto composuerit, horis ad humeros usque sensim auctus assurgit; quo ubi pertigerit, quæ prius interdiu domestica obire valuerit munia, nunc sese vix omnino in lecto commovere audet; quod si, nisi admodum caute, sategerit, extemplo Paroxysmum (secus non nisi post plures horas invasurum) eumque multo severiorem, certo accersit. Parum hac nocte, præ dolorum molestia dormit, qui Caput nunc atrocius infestant: Horum Cruciatu mane in turbulentam Somnolentiam transit, cujus etiam causa toto die *Dominico* à lecto abstinere nequit; nempe matutinis Horis dormitat quidem, sed inquietè, atque aliquoties à Somno expergiscens potum exposcit, quo sumpto se iterum Somno tradit. Hora circiter 12. si non sponte evigilet, astantium interpellatione excitatur, cibosque monita sumit, rerum omnium circa se transactarum adhuc probe conscia: Dein statim in Somnum relabitur (nisi verius Animi torporem dixeris, quippe nec excitari amplius potest, nec cujusvis rei nunc actæ memoriam retinet) cum frequenti Corporis in lecto jactatione, quoad sextam præterpropter horam vespertinam detinetur. Hac hora ingruunt *Convulsiones* sed interpolatæ, ad horas quinque eam exacerbantes; quæ primo mitiores, tandem circa horam undecimam maxime violentæ evadunt, per quarum Intervalla oblatam Allam (tenuiorem enim potum ipsa, dum mente constat, vetat sibi in Paroxysmo porrigi, noxam inde Ventriculo imprimi experta) avidè haurit. Elapsâ hac horâ redit, quâ per tot horas caruit, Mentis usura, omniumque deinceps agendorum noticia, verum reliqua Noctis parte se irrequieta in cubili jactat, prorsus insomnis. Die *Lunæ*, circa horam 9 matutinam, lecti tædium non amplius tolerare valens, ex eo surgit, sed toto die universo Corpore dolet; & quamvis hoc die sat libere domum suam obambulet, jurisque nigri pocula Hospitibus propriis manibus ministrat, Artus tamen rigidos quasi, adque motum parum aptos queritur, qui tandem Somni placidissimi, sequenti nocte obrepentis, mulcedine torporem deponunt (nulla tamen accidente, sive per Sudorem, sive Urinam, sive alio quocunque modo, saltem sensibili, critica Evacuatione; ut pronum mihi sit conjectare, Materiam ex *Cerebro* detrusam à Sanguine reforberi, in Fermentum pro novo Paroxysmo excitando denuo maturandum) duorumque hinc vel trium dierum induciæ conceduntur, donec novo aggesto Fomite eadem denuo adornatur Symptomatum Scena. Nulla à multis retro annis admittere voluit Remedia, utpote eorum infructuosa administratione tamdiu, ante hæc lassata. Unum præterea satis rarum occurrit, quodque forte mente eam minus constare suspicionem daret, nisi ubique notum esset, Nervoso Genere affecto, notabiles inde Impressiones in Animum fieri: Nempe à longo tempore persuasam habuit se, si extra fores se proriperet, Paroxysmo confestim tentandam iri, proinde se intra proprios Parietes continenter per aliquot Annos clausit; cum verò ante 20 Annos præ importuna Solicitatione vicini cujusdam *Ædes* cœnatum adiret, statim atque in illas se receperat, in eum, prout mens ominata fuerat, extra usitatam Periodum incidit.

incidit, ut necesse habuerit Domum reportari, ubi solito graviores per-
 pessa est. Exinde nunquam extra Limen suum excessit, nisi cum Ædes
 ante 18 Annos (in Cathedra deportata) novis mutaret, quo momento,
 licet haud statò recursus die, invasere Paroxysmi perque 10 dies conti-
 nuos, bis in singulis invadentes, persistebant, donec tandem ad solitum
 redierint tenorem. Veruntamen pedem unum extra limen imò totum
 Corpus, modo Pollicis pedis summum apicem intra limen detinuerit, exe-
 rere & audet & solet; integro autem Corpore vel latum Unguem inde
 excedere nec audet, nec ullo pretio obtinueris, non si Talentum obtuleris.
 Cum olim famosus ille Chiriater *Greataxius Vigorniae* ageret, ad hanc
 adductus est, ut quid in tam raro affectu valeret ipsius Manus experiretur:
 Illa autem, audito hunc eo consilio appulisse, nondum tamen viso, in gra-
 vissimum Paroxysmum incidit, qui non ante Septimum ab insultu diem
 eam deseruit. Interea toto hoc tot Annorum Curriculo nullam extra Pa-
 roxysmos vel Intellectus, vel Functionum cæterarum Animalium, notabi-
 lem Læsionem passa est, quin (cum bono, adque pinguedinem vergenti,
 Corporis habitu, vultuque florido) non minus expedite, pro ratione ætatis,
 negotia domestica, adque eam quam exercet Vocationem spectantia, exe-
 qui videtur, quam si nullo omnino, præcipue Capitis, Morbo laboraverit.

*Discoveries in the
 Optick Nerve; by
 S. Malpighi. n.
 27. p. 491.*

XII. *S. Malpighi* having Dissected the Head of a *Xiphias* or *Sword-Fish*,
 which hath a very big Eye, observ'd that the middle of the Optick Nerve
 is nothing else, but a large Membrane, folded according to its length in ma-
 ny Doubles almost like a Fan, and invested by the *Dura Mater*. This Stru-
 cture of the Optick Nerve is only to be found in the Eye of Fishes. For that
 of an Ox, Pig, and other such Animals, is nothing but a Heap of many
 small Fibres of the same Substance with the Brain, wrapp'd about with the
Dura Mater, and accompanied with many little Vessels with Blood. Hence
 it appears that there must be many Cavities in this Nerve; for as much as
 the small Filaments, of which it is composed, cannot be so closely joyn'd,
 that there should not be some void space betwixt them.

*A Man who be-
 comes blind after
 Sun-set by 17.
 Ter. Parham. n.
 359. p. 559.*

XIII. 1. I was lately in *Suffolk* where I met with a Young Man, about
 20 Years of Age, who all the Day hath a good Sight, and distinguisheth
 Objects at all Distances as well as any Body, and with as much Vigor and
 Unweariedness; but when Twilight once comes he is quite Blind, and sees
 nothing at all; so that he cannot without great Difficulty direct himself A-
 broad, or even at Home by the Lights of the Fire or Candle.

I view'd the Boy both by Day and Night: But there is no Disease in the
 Organ that can be observ'd; no *Vertigo* or Distemper in the Head to inter-
 rupt or any way intercept the Spirits in their Motions, but to all appearance
 the Fabrick of the Organ is very true and exactly well, and never disturb'd
 with Fluxes any way. I try'd him with Spectacles for Variety of Sight, but
 they did him no Service either by the Lights of Fire or Candle. He tells
 me, That he was thus from the first Time he was able to take Notice of
 Things, and it came without Distempers; That this Cloudiness comes
 gradually upon him like a Mist, as Day-light declines; That he is always
 alike

alike in all *Aspects* of the *Moon*; He feels no Pain by Fire or Candle-light; He finds himself no worse in Winter than Summer; and observes no Mischief upon taking Cold; He sweats much at Work, but finds no difference as to his Sight in those Days when he works hard or not.

2. The Case now mention'd (though indeed in a different Sense from that of *Hippocrates*) is called by many Writers *Nyctalopia*, or *Nocturna Cæcitas*, and is accordingly describ'd by them with the Remedies for it. *Cornellius Celsus* mentions it under the Title of *Imbecillitas Oculorum*.

By Dr. Will. Briggs, ib. p. 562.

3. Vulgo notum, quod interdiu quam plurimi Vapores, à Sole rarefacti, attolluntur, qui deficiente Calore post ejus occasum à Frigore densati descendunt; quodque inde Aer præcipue prope Terram fit spissior. Ad eundem modum forsan Humores in *Oculo dicto Juvenis* afficiuntur; uti & Vespere ab istis Vaporibus aliquantulum spissiores vel magis turbidi facti sint: Sicut Urinis sæpe accidit, quæ prout Frigori vel Calori admoventur, turbantur vel clarescunt: Dum Sol agit supra Horizontem, vi Caloris sui, amotis Vaporibus densatis, clarescunt Oculorum Humores; at cum Horizontem subit, (à Causa contraria) Humores turbantur, atque inde recta illa, quæ requiritur, Dispositio Oculorum immutatur: Nam ex spissitudine illa Humorum, Radii retusi vel refracti, ad *Retinam* vix pertingunt; vel si pertingant, agunt cum Impulsione nimis debili.

A Solution of this extraordinary Case; by Dr. Will. Briggs n. 166. p. 304.

Huic Hypothesi apte conveniunt omnia quæ enumerantur Phænomena. Primo enim semper à Cunabulis prædicto Juveni contigit hic Affectus, sine defluxione, vel alio aliquo Oculorum Morbo; cujus Causa est eadem peculiaris innata Humorum Diathesis, qui post Solis Occasum à Vaporibus, ut supra, simili modo afficiebantur. Secundo Cæcitas hæc gradatim obrepfit, à Vaporibus post solis Occasum gradatim descendentibus. Tertio ab Influxu Lunæ nulla immutatio, quoniam Ascensus & Descensus Habituum de Influxu istius Planetæ non pendent. Quarto suspicor intimos Humores (nimirum *ChrySTALLINUM* & *VITREUM*) adeo esse viscosos, ut (clarescente *Aqueo*, Tunicaque *Cornea*) nequaquam dissipentur. Quinto Cæcitas nec major nec minor vel in Hyeme vel Æstate; ratio videtur, quoniam licet dicti Vapores non semper pari copia descendant, tamen semper tanta Copia ut eundem effectum producere possint: Sicut aliquando vidi Aquas quasdam acidulas in Vicinia nostra Foliiis quibusdam Quercus contusis & infusis purpurascens, at Color à fortiori Infusione non intendebatur: Ita Vespere semper satis Vaporum descendentium ad Effectum producendum; at si plus satis, nulla immutatio.

Alius aliter sentit, quod cum nulla in prædicti Juvenis Oculis observetur Nubecula aut Obscuratio, rarioris hujusce *φαινομένης* ratio probabilior petenda est à Dispositione *Nervi Optici*, cujus tubuli influxu Solari repleti (quas vocant *Visibiles*) facillime admittant; eodem autem destituti, flaccescunt; & ad Visionem inepti redduntur.

XIV. One *Daniel Wright*, aged about 19 Years, and of a Sanguine and Plethorick Constitution, about the End of the Year 1683; was seiz'd with a Dizziness, and Pain in the upper Part of the Head, which he told me, he could impute to nothing but the excessive Cold Weather, which then rag'd

A Duplcity of Vision, and a Great Serena after great Pains in the Head and Convulsions.

*See Hist. by Dr.
Briggs. n. 159.
p. 503.*

rag'd with us to Extremity. Hereupon having the Misfortune to apply himself to an Ignorant Pretender to Physick here, a Plaister for his Head was only order'd at that Time without any Evacuations. The Patient upon this grows much worse, the Pains of his Head more fix'd and girding (I suppose from some Spasms or constrictive Motions of the *Meninges*) to which succeeded Convulsive Fits (which were accompanied afterwards with a Tremor upon his Arms and Legs) and upon this, all Objects appear'd double to him, from the Fibres of the *Optick Nerves* being thus distorted from their wonted Parallelism. After he had been thus torment-ed about 3 Months, he was taken into *St. Thomas's Hospital*. Upon his Admission I examin'd his Case, and judg'd that the *Optick Nerves* were affected, and that it was gone so far that it would probably end in a *Gutta Serena*. However we endeavour'd by all the Ways we could to relieve him. Accordingly we order'd the *Cephalic Pills*, and an *Electuary* (which we use in the Hospital in *Epileptick Cases*) which he receiv'd much Benefit by; he was also (by Intervals) bled in the *Jugulars*, and in the *Hæmorrhoids*, and by Leeches, which also gave him good Relief, his Head was shav'd, Blisters apply'd to his Neck, and a Seton made some time after, &c. we endeavouring by all manner of Revulsions to drive t^e Humor another way, if it were possible. But it was too much fix'd, so that about Two Months after he had been under our Care, a *Gutta Serena* seiz'd on his Right Eye, that he could not see at all on that side; but then the Duplicity ceased, and he saw all Objects single again as before.

Whilst we were solicitous about preserving the Left Eye, which was still in danger, a severe Fit seiz'd him, soon after which he died. I mist the Opportunity of Opening the Body; but I was told, that in the upper part of the Head, Neck, and Shoulders, a great Blackness appear'd, not long after he was dead, from the settling of the Blood, I suppose, in those Parts.

Several remarkable Cases relating to the Eyes; by Dr. Dawbney Turberville. n. 364. p. 736.

XV. 1. The Disease which I call *Bursa Oculi*, or the Pouch of the Eye, is a Bag without Matter in it, (like an empty Purse) on the White of the Eye, under the upper Lid; it hung flag about the length of a Thumb-nail.

2. Another Person had no visible Disease in his Eyes, but could not see at all unless he squeez'd his Nose with his Fingers, or saddled it with narrow Spectacles; and then he saw very well.

3. A Maid about 23 Years Old, came to me from *Banbury*, who could see very well, but no Colour beside Black and White. She had such Scintillations by Night (with the Appearances of Bulls, Bears, &c.) as terrify'd her very much; she could see to read sometimes in the greatest Darkness for almost a Quarter of an Hour.

p. 737.

4. A Saddler's Daughter of *Burford*, had an Imposthume whsch broke in the corner of one of her Eyes; out of it there came about 30 Stones as big as Pearl, and splendid; after which she had a *Fistula*, which I cured.

4. Here was one in *Salisbury*, who had a Piece of Iron, or Steel, stuck in the *Iris* of the Eye; the Person was in very great Pain, and came to me; I endeavour'd to push the Iron out with a small *Spatula*, but could not; I then apply'd a Loadstone to it, and immediately it jump'd out.

then apply'd a Loadstone to it, and immediately it jump'd out.

6. I was consult'd by a Maid who had a Pustle broke in her Eye, out N. p. 738. of which there came fine small Sand like Chalk, for many Weeks together: I made use of Purging, Fumigation, and some Topicks, by which she recover'd her Sight in a very great measure.

7. About 6 or 7 Years ago, I had one Mr. Oyliff in Cure of his Eye. N. 167. p. 839. It was as big as my Fist, black, fleshy, and full of bluish Bladders; this I judg'd to be a Cancer, After Purging and Bleeding, I cut out the Ball, and ulcer'd Flesh, by many Cuts, which were all insensible to him, till I came to the Optick Nerve: At the last Cut he complain'd, and bled a little; the Wound was heal'd in about a Fortnight.

8. A young man, my Patient, had an Eye as big as an Hen's Egg, very fair, without Blemish, Rheum, or Redness; and his Sight was pretty tolerable; I judg'd these Symptoms to proceed from thin Humours fallen on the Eye, and extending its Coats: I cur'd this Distemper by applying drying Medicines to the Head and Eyes, and making an Issue in *Nucha*; *Appello Morbum Oculum Bovinum*; *five Oculi Hydropem*.

XVI. When I was not above 60 Years of Age, my Sight was so much decay'd, that I seem'd always to have a kind of thick Smoak or Mist about me, and some little black Balls to dance in the Air before my Eyes; An easy Help to a decay'd Sight. N. 37. p. 727. I could not distinguish the Faces of my Acquaintance, nor Men from Women, nor keep the plain trodden Paths except I was led. I receiv'd no Benefit by any Glasses, but was in the Case of those whose decay by Age was greater than could be help'd by Spectacles. The fairest Prints seem'd thro' Spectacles like blind Prints, little Black remaining. But I found great Help by the following Expedient: I took Spectacles that had the largest Circles; close to the Semicircles, on the over part, on both Sides, I cut the Bone; then, taking out the Glasses, I put black Spanish Leather taper-wise into the empty'd Circles, which widen'd enough (together with the increasing Wideness of the Leather,) took in my whole Eye at the wider End; and presently thro' the smaller End I could read the smallest Prints that are, as if they had been a large and fair Character. I made these empty Tubes of different Lengths, and the smaller Ends of different Bignesses; I can only put the very End of my little Finger into the Orifice of the lesser, but the same Finger somewhat deeper, yet not quite up to the first Joynt, I can Insert into the Orifice of the wider.

The Tubes may be of Paper only colour'd Black, and pasted on, and with the inner Folds to be drawn out from one Inch to three; some of the Folds to be taken out, that the Orifice may be wider or narrower, as best fits to every Degree of Defect.

Probably, these Tubes may be proper for some that are Squint-eyed, whose Eyes do interfere; but certainly they will ease them that cannot well bear the Light, and perchance they will preserve the Sight for longer Durance.

After I had us'd these Tubes little more than a Week, I could use them without much Trouble all the Day long; and my Sight was so much

amended, that I could see the Greenness of the Garden, and Pastures in a florid Verdure, whereas before the use of them, all dark Colours had the same Hue to my Eye.

N. 39. p. 765. I have sometimes put Convex-Glasses (for a Tryal) into my Tubes; but found the Prints, tho' something larger, yet not so clear, so distinct, nor so pleasing to the Eye, as when I used the empty Tapers. I find myself best at Ease with those Leathern-Tubes that are made without fastening to the Bone of the Spectacles; for as they hang in that slight manner, I can with a Touch of my Finger raise them up or bow them down, divide or unite them, to take in the same Object.

N. 40. p. 802.

I found at first a great Discouragement in the Difficulty of using 'em, so that I could not endure the Trouble above 2 Hours at a time: But by the Practice of a Week or a Fortnight, I found 'em an Ease and Pleasure to me for 12 at least of each 24 Hours. And by all the Tryals which I have yet made upon others, whether *Pore-blind*, or of faint Sight decay'd by Age, or however weaken'd, it proves a very great Aid. For the *Pore-blind* they must be made shorter: For the decay'd by Age, they may be longer.

An Experiment
concerning Deaf-
ness; by Dr. W.
Holder. n. 35. p.
665.

XVII. A Young Gentleman, who was born *Deaf*, and continu'd Dumb till his Age of 10 or 11 Years, was committed to my Care. His Mother when she was great with him, receiv'd a sudden Fright; by Occasion whereof, the Child's Head and Face were a little distort'd, the whole Right Side (as I remember) being somewhat elevated, and the Left depress'd; so that the Passage of his Left Ear was quite shut up, and that of the Right Ear proportionably distended, and too open, I found, upon Examination, that the *Auditory Nerve* of his Right Ear was not perish'd: And I suppos'd the Defect to lie in the Want of due Tension of the *Tympanum* of his Ear; whose Use I took to be only to preserve the *Auditory Nerve*, and Brain, and inward Parts of the Ear, from outward Injury by Cold, Dust, &c. For it is requisite that the *Tympanum* be Tense and hard stretch'd; otherwise the Laxness of that Membrane will certainly Dead and Damp the Sound. The Tension of this Part is the Principal Office of the 3 *Offices*, viz. the *Malleus*, *Incus*, and *Stapes*; whereof the *Stapes* is fix'd to the inner Bone, and Part of the *Malleus* to the *Tympanum*, and the *Incus* between them joyn'd on one Part to the *Malleus*, and on the other Part to the *Stapes* by *Ginglymoide* Joynts, and by the Help of a Muscle drawing the *Incus*, these 3 Bones are brought to a curv'd or arch'd Posture, and the *Stapes* being fix'd unmoveable the *Malleus* yields, to bring the Terms of that Line nearer, in proportion as it is curv'd, and draws the Center of the *Tympanum*, stretching the Surface of it from a Plain to a Conoide Figure within the same Circumference. And I conceive the Action of this Muscle does ordinarily and constantly draw the *Tympanum* to a moderate Tension; but when we have Occasion to listen, and give a more particular Attention to some Sound, the Action of that Muscle is then more Intense, and the *Tympanum* is drawn to a more than ordinary Tension, so to facilitate the Passage of the Sound.

Upon

Upon these Considerations I advis'd his Mother to consult with Physicians, if by some astringent Fumes or otherwise it might be restor'd to a due Tension. In the mean time I thought of a temporary Way by the Impulse of any vehement Sound; as of a Drum beaten near him: Which Sound, during its continuance, must needs give the *Tympanum* a Tension, by driving and swelling it inwards, as a fresh Gale of Wind fills the Sails of a Ship; and the Experiment succeeded according to my Expectation. For so long as I beat a Drum fast and loud by him, he could hear those that stood behind him, calling him gently by his Name (which he understood, having learn'd to speak and pronounce it among other Words;) and when the Drum ceas'd, he did not hear the same Persons, when they again very loud call'd him by his Name. And this we try'd several times, by beating the Drum again, and ceasing it; and he still heard them when the Drum beat, and heard them not when it stopp'd.

Having mention'd this Experiment to a Gentleman about *Oxfordshire* in a great Degree of Deafness, he call'd to Mind that he never heard so well and easily, as when he was Discoursing with Company in a Coach, whilst it went fast, and made a great rumbling Noise in *London* Streets; by which he was induc'd to believe, that the Impediment of his Hearing was of the like Nature with the other.

XVII. In *Structura interiori Organi Auditus*, imprimis animadverti, *Membranam tenuissimæ raræque admodum Texturæ intra Cavitatem Tympani esse*: Hanc, habita ratione Loci quem occupat, interiorem *Membranam Tympani* nuncupo, ut ab ea distinguatur quæ *Meatus Auditorii* finem extremum obturat, & quam exteriorem ipsiusmet *Tympani* *Membranam* nominare placet. Hæc Membrana, si attentè perspiciatur, in utraque *Aure* *Vasis Capilaribus* penè infinitis apparet irrigata, quæ *Carotis Arteria*, & *Vena Jugularis* utriusque lateris ipsi largiuntur. Hinc fit, ut *Vasculis*, quibus irrigatur, *Sanguine* supra modum turgentibus, tota ferè rubra videatur, cum *Radium Solarium* Interventu, ac præsertim *Microscopio* intermedio exploratur. Ejusmodi *Vascula* impediunt ne *Membrana*, qua suffulciuntur, partes, superna scilicet & laterales, in semetipsas corruant, & complicantur, uti procul dubio corruerunt & complicarentur, nisi eas suspensas tenerent; quoniam per seipsas interiori *Superficie* hujus, qua continentur, *Cavitatis* immediate non adhærent.

The Organ of Hearing; by Dr. Raymund Vieussens. n. 258. p. 370.

Hæc ipsamet *Membrana*, quæ est productio *Membranae* tenuis interiora *Aqueductus* investientis, *Os Speciei* cujusdam specus occludit, quæ itur ad *Foveolas* intra *Mastoidem Apophysin* excavatas; proindeque impedit ne conclusus in iis *Aër*, libere saltem, cum *Aere Tympanum* subeunte communicet; ac præterea tenuissima ejus productio una *Stapedis* aperturam, altera verò *Foramen* vulgò *Rotundam* nominatum, obturat, & ulterius extensa toti *supersternitur* interiori *Superficie* exigui hujus *Spatii cavi*, quod à *Foramine Rotundo* extenditur ad extremum usque finem *Ductus Semi-ovalis* *Spiralis Cochleæ*, & usque ad *Rimulam incisam* *Basi Conchæ*. Ita ut interior *Tympani* *Membrana* hac productione sua intermedia, qua scilicet extremitatem *Ductus Semi-ovalis* *Spiralis Cochleæ*, & *Rimulam* *Basi Conchæ*

chæ insculptam, extrinsecus occludit, communicet, cum hac portione Membranæ Nervæ interioribus Conchæ Parietibus Superstratæ, quæ Basos Conchæ ejusdem Rimulam imus claudit, & cum extremitate Laminæ Nervæ Spiralis, quæ intra Luctus Semi-ovalem Spiralem Cochleæ reconditur. Præterea Membrana, de qua nunc agitur, subtus illam sui partem, qua externam *Tympani* Membranam respicit, sat amplum relinquit spatium vacuum, quod *Aquæductis* ad se delatum Aërem extrinsecum admittit: Intererea hæc in semetipsam ita convolvitur, & complicatur; ut intra eam tres formatur Cavitates. Prima hujusmodi Cavitatum occupat spatium, quod externæ *Incudis* Apophysi, & huic interjicitur Specui, quæ itur ad Foveolas Apophyseos *Mastoidis*, ut supra dixi: Secunda primæ & tertiæ intermedia, iisque minor præcisè Basi *Conchæ* Substernitur, & *Malleoli* Caput, nec non firmè totum *Incudis* Corpus, intra se recondit: Tertia omnium amplissima internum *Aquæductus* Orificium respicit, & intra se continet Ventris primis primi Auris internæ Musculi & *Incudis* portionem unà cum binis illius Apophysibus, *Stapedem*, *Os Lenticulare*, Tendinem secundi Auris internæ Musculi, & Cervicem unà cum Manubrio *Malleoli*.

Demum Membrana de qua nunc loquor, in quibusdam tantum Homini- bus ita conformatur, ut parva illius portio in Membranulam tenuissimam abeat, qua dimidium circiter spatium tertiæ nec non maximâ Cavitatum ejus comprehensum in duas partes velut Septo intermedio dividitur. Ejusmodi Membranula à nullo Anatômico, quod sciam, hætenus descripta, in omnibus ferè Hominibus desideratur, & in iis, in quibus reperitur, superna sua parte Basi *Conchæ*, & inferna exteriori *Tympani* Membranæ *Meatus Auditorii* finem extremum occupanti, & obturanti alligatur, eamque in binas partes firmè equales ex transverso secare videtur, ad extremum usque finem Manubrii *Malleoli*, cui adhærescit, imo & paulo ultra. Ita ut Membranula ista unà cum extremo fine Manubrii *Malleoli* mediam partem Exterioris Membranæ *Tympani* versus interiora Cavitatis ejus attrahat, eamque ita inclinet, ut è regione *Meatus Auditorii* parum Concava, & è regione Cavitatis *Tympani* parum convexa sit. Hæc Membranula apta nata est quæ, in Hominibus in quibus non desideratur, impediat ne validioribus Musculi Monogastrici Auris internæ Contractionibus exterior *Tympani* Membrana supra modum distendatur, vel extremitate Manubrii *Malleoli* dilaceretur, cum prædictus Musculus Convulsione, vel Motu convulsivo, afficitur. Ita ut hæc Membranula vices quodammodo supplere videatur Musculi Antagonistæ Musculi Monogastrici, de quo nunc dixi, si spectetur quatenus tendine suo gracili & longo agens, ut ex dicendis in sequentibus patebit.

Si quis horum omnium perspiciendorum jucunda Curiositate frui velit, *Os Petrosum* secernat à reliqua Calvaria Hominis Strangulati, vel *Pbrenitide* aut *Apoplexia* perempti, si fieri possit: Os illud à reliqua Calvaria secretum per biduum in loco Sicco Servandum, ut per id tempus Membrana, quam nunc describo, parum exsiccet, adeoque in semetipsam contrahatur, ut, quantum par est, secedet ab interna Superficie Cavitatis, intra quam continetur, nè ab Anatômico illius Texturam penitus exploraturo dilaceretur. Postea Os sat tenue, quod supernam *Tympani* partem constituit, frustulatim Cultro peritè secandum, & auferendum est. Et verò cum

primum

primum *superna Tympani* pars secta & ablata fuit, Membrana, de qua nunc, intra Cavitatem illius antea latens, Oculis subjicitur, & adeo numerosis Vasis capillaribus irrigatam sese prodit, ut hæc, cum singula ejus Vasa repleta sunt Sanguine, speciem quandam *Retis Mirabilis* repræsentet.

Membrana jamjam descripta mirabilibus sanè muniis præstandis, & mox designandis, dicata est. Imprimis hæc qua tenui productione sua occludens *Labyrinthi* januam impedit nè naturalis purissimus ac subtilissimus Aër intra diversas Cavitates, diversosque illius Meandros latens Communicationem, saltem valde liberam, habeat cum Aëre crasso, qui *Tympani* Cavitatem *Aquæductis* subit. 2^o. Hæcce Membrana miti Calore Sanguinis Vasorum, quibus adornatur, osseam *Labyrinthi* totius Basin lenitur calefacit, & uno eodemque tempore fovet atque conservat Motum Aëris in binis Vestibulis, flexuosisque omnibus illius Ductibus conclusi, & Lymphæ defæcatisimæ Animalis Spiritu imprægnatæ, qua singula Nervi Mollioris Auris Propagines inferius describendæ imbuuntur. 3^o. Eadem Membrana intra Cavitates suas Aërem benigno Calore Sanguinis Vasorum suorum maxime rarefactum continet, qui utpotè maxime rarefactus, atque adeo tenuissimus, & magna Æthereæ Materiæ Copiâ impregnatus valde aptus est, qui Corporum omnium Sonorum Impressiones faciliè recipiat, easque citissime ad Aërem, & singulas Propagines Nervi mollioris Auris interiora *Labyrinthi* adornantes, nec non ad ovale Cerebri Centrum transmittat.

Ex iis, quæ modo diximus, planè sequitur Membranam, de qua nunc agitur, Auditui producendo mirum in modum conducere: Ita sanè hæc, utpotè valde tenuem raramque Texturam habens, liberum in Cavitates suas introitum, pariterque liberum ex iis egressum præbet Sonorum Objectorum Impressionibus, quæ cum primum Aëri Caput ambienti communicatæ fuerunt, Æthereæ, qua gravidus est Aer, materia motu, & Membranæ exterioris *Tympani* innumeris Foraminibus insensibilibus perviæ, nec non *Aquæductus* interjectu ad ipsam transmittuntur. Ac re quidem ipsa quævis, nisi mea me fallit Opinio, Objectorum Sonorum Impressionis Aëris, intra Cavitates Membranæ supra descriptæ contenti, aut ipsam extrinsecus ambientis, quâ scilicet Æthereâ gravidæ materia interventu Momento citius interiora *Labyrinthi* per Portam & Fenestram illius subeunt, & ex eodem *Labyrinthi* Interjectu Spiritus Animalis, cui inibi communicantur, etiam Momento citius ad ovale usque Cerebri Centrum transmittuntur; ibique loci pro diversis Sonorum Objectorum Impressionibus diversæ excitantur in Anima Idææ, diversas Soni Species designantes quæ diversis Nominibus exprimi solent. Eorum, quæ modo diximus, Veritas Experientia confirmatur; quoties enim pus Abscessus intra *Mastoidem* Apophysin, vel intra *Tympanum* ipsam producti hanc, de qua nunc, Membranum dilacerat, prorsusque rodit, toties *Auditus* ita læditur, ut multum imminuatur, si non prorsus aboleatur.

Ex supra dictis clare intelligitur, intra *Tympanum* necessariò excitandum esse tumultuosum quendam Motum, præternaturalem Sonum producentem, quoties immodico Cibi, Potusque usu, vel Obstructionibus imi Ventris, vel longis, plurimumque laboriosis Animi Contentionibus, vel aliâ quapiam Causâ nimia Sanguinis supra modum rarefacti, & Vaporosi, quantitas.

quantitas ad Vascula superius descripta Membrana amandatur. Is enim Sanguis nimia Copia nimiaque Rarefactione sua eas, quibus devehitur, Arteriolas magis quam par est dilatat necnon pulsatur, & tum nimia hujusmodi Vasorum Dilatatione atque Pulsatione, tum nimio Halituum copiosorum, quos emittit, Motu hanc Membranam ita concutit, ut tumultuosus aliquis Strepitus intra *Tympani* Cavum necessariò exciteretur: presertim si Vapores illi propter *Aquæductus* Obstructionem, vel propter nimis compactam Texturam Exterioris Membranae *Tympani* facile transpirare nequeant. Tumultuosi autem hujusmodi Strepitus Impressio, ad ovale usque Cerebri Centrum translata, hanc in Anima excitat Ideam, quæ murmuris Auris nomine vulgò exprimi solet. Hujusce Murmuris tres sunt Species omnibus notæ & à nemine, quod sciam planè ac distinctè explicatæ; *Bombus* scilicet, *Sibilus* & *Tinnitus*. Quoties Vapor supra modum copiosus, & exagitatatus, qui *Murmur* aliquod in Auribus excitat, ita humidus est, ut ad Naturam Aquæ sat propè accedat, Internam facilièque mobilem Membranam *Tympani* relaxat, & uno eodemque tempore ipsam movet varièque flectit: hinc fit, ut hæc Membrana non nihil relaxata, motuque sibi communicatio variè ac velut undatim flexa cum ambientem, tum intra Cavitates suas reconditum, Aerem ita exagitet, ut vibrationes debitas lentè necnon flexuosè, ac velut undatim sese invicem excipientis patiatur, quales ferè patitur, dum vel ab Aqua è loco sublimi delabente, & cum primum delapsa est, undatim defluente, vel quamplurimis ab Apibus simul congregatis, & partim sursum, partim deorsum, partim obliquè, partimque in orbem motis agitur. Istæ autem Vibrationes Spiritus Animalis Nervi Mollioris Auristextum interius occupantis Interjectu, ad Ovale usque Cerebri Centrum delatæ, hanc excitant in Anima Ideam, quæ Sonum tumultuosum gravem *Bombi* Nomine vulgò expressum designat. Ubi Vapor Murmuris cujusdam in Auribus excitandi capax particularum Aquosarum tam inops est, ut potius Exhalationis siccæ, quam meri Vaporis naturam redoleat, atque adeo flatulentus sit; is Membranam internam *Tympani*, dum huic alliditur, quadantenus exsiccatur, illam expandit, atque distendit. Inde fit, ut hæc Membrana communicato sibi Motu nonnihil exsiccata, & expansa, adeoque plurimum distenta tum ambientem, tum intra Cavitates suas latentem Aerem ita concutiat, ut in eo Vibrationes validas exciteret, quæ successive sanè, sed tamen cito, & rectis vel ferè rectis Lineis sese invicem consequuntur. Ita ut ejusmodi Vibrationes his ferè similes sint, quas patitur, quoties mero Flatu supra modum exagitur; proptereaque illæ ad Ovale usque Cerebri Centrum eà, qua supra explicatam fuit, ratione transmissæ, hanc excitant in Anima Ideam quæ Sonum tumultuosum sat acutum *Sibili* nomine vulgò expressum designat. Quoties Interior Membrana *Tympani*, aut aliqua pars illius, ab Arteriis ipsam irrigantibus solito frequentius, validiusque Succussibus sese velocissime excipientibus ob Sanguinis fluxum tunc in his aliquatenus impeditum quatitur, toties illa (si tunc temporis præcalido & exsiccante quodam Halitu ita distendatur, ut immixtos sibi Succussus valide reperiatur) tum ambientem, tum intra Cavitates suas reconditum Aerem ita exagitat, ut easdem aut ferè easdem patiatur Vibrationes, quas pateretur, si Vibrationes illius Argenteo

teo Malleolo excitarentur, quo scilicet parvis ictibus iteratis citissime sese excipientibus Incus parva percuteretur, quæ ex Argento, vel alio quodam Metallo valde sonoro, proindeque ad incussos sibi ictus valide re-percutiendos apto, conflata esset: Unde mirum non est ejusmodi Vibrationes, cum ad Ovale usque Cerebri Centrum pervenire, hanc excitent in Anima Ideam, quæ sonum præternaturalem *Tinnitus Auris* nomine vulgò expressum denotat.

Musculos etiam Auris Internæ multis ab hinc Annis sapissime indegavi, & partem hanc duobus tantum instructam esse semper observavi. Hi Nervulos penè insensibiles à Nervis quintæ Conjugationis recipiunt, & Vasculis Sanguiferis etiam penè insensibilibus irrigantur, quæ sunt Arteriæ *Carotidis*, & Venæ *Jugularis* internæ Propagines. Illorum Primus crassior & longior bina Capita, binosque Tendines habet; unicum veto Ventrem, ideoque Musculum *Monogastricum* nominare lubet. Primum Caput, Vaginulâ Membranaceâ vestitum, è sinu exiguo Osseo supra partem supernam *Aquæductus* excavato emergit; Secundum verò, quod mere carnosum apparet, non procul à latere externo exigui sinus Ossei, de quo mox dictum, suam ducit Originem. Fibre carneæ bina diversa Capita Musculi, de quo nunc agitur, componentes invicem strictissime uniuntur paulo antequam *Tympani* Cavitatem subeant, & tunc in Ventrem Vaginâ membranaceâ sat valida undequaque cinctum unius & ejusdem Musculi desinunt. Deinceps ipsæmet Fibre carneæ, de quibus jam loquor, versus *Tympani* Cavum sese porrigentes, paulo postquam illud subierunt, ab invicem separantur, & in binos Tendines Vaginulâ membranaceâ validâ indutos abeunt. Horum Primus, Secundo longior nec non gracilior, postquam sese parum sursum erexit, parvæ Trochleæ membranosæ interventu huic Ossis Petroso parti alligatur, cui insculptum est Initium *Aquæductus Fallopii*, seu Canaliculi Ossei, qui Nervum durum Auris admittit; ita ut Officioso hujusce membranosæ Trochleæ ministerio liberè motus omnes edat, quibus edendis dicatus est: Tendo iste deorsum reclinatus super gracilem *Malleoli* Apophysin ad Perpendicularium descendit, eique annectitur sese parum expandendo; unde fit ut ejus Nexus ad Cervicem usque ipsiusmet *Malleoli* extendatur. Secundus Musculi, quem jam describo, Tendo, Primo brevior & crassior, multumque crassâ Vaginâ membranaceâ vestitus, in Cavitatem *Tympani* rectâ ferè porrigitur, & mediæ Capitis *Malleoli* parti annectitur, ibique ita explicatur, ut ejus nexus ad Corpus usque *Incudis* protendatur, adeoque binis ejusmodi Ossibus invicemnectendis inserviat: Tendo iste Ossi, cui supersternitur membranaceæ Vaginæ suæ Interventu alligatur. Secundus Auris Internæ Musculus emergit è Tubulo Osseo excavato in parte infima Ossis, quod Portæ *Labyrinthi* & illius Fenestræ Interjicitur. Musculus iste Musculo *Monogastrico* supra descripto multo minor & brevior est: Hinc fit, ut illum Musculum Minorem Auris internæ nominem. Ventrem carnosum sat crassum habet, & Tendine suo maximè gracili Capiti *Stapedis* inferitur.

Dum Musculus *Monogastricus* Auris in semetipsum contrahitur, longior illius Tendo Caput *Malleoli* & Corpus *Incudis* parum sursum tollit. Parum solummodo dixi sursum tollere, quoniam Tendo brevior ejusdem Musculi, utpote Capiti *Malleoli* extremo suo sine annexus, quemadmodum longior illius.

lius Apophysi gracili, atqui cervici annectitur, longiori renititur, dum sese contrahit; quia Vaginâ suâ ossi alligatur, cui superjacet, ut supra notatum, & propter ejusmodi Nexum versus superiora multum tolli nequit; unde fit, ut Tendinis longioris sese contrahentis Nisui quodammodò resistat, & impediat ne Caput *Malleoli* unâ cum *Incude* versu superiora multum tollat. Ubi *Malleoli* Caput sursum tollitur, Extremitas *Manubrii* ejus necessario deorsum inclinatur, adeoque partem mediam, cui adhærescit, exterioris Membranæ *Tympani* ex interioribus ejusdem *Tympani* versus exteriora pellit, atque adeo illam tendit, ejusque Superficiem planam aut saltem fere planam, reddit. Dum Tendo Musculi *Monogastrici* Auris, de quo nunc, & *Malleolus* hæc, que modo dixi, munia præstant, hanc extendunt Membranulam supra descriptam, quæ Membranam exteriorem *Tympani* ex transverso secare videtur, cum non desideratur. Ita ut ejusmodi Membranula Musculi *Antagonistæ* Musculi *Monogastrici* Auris vices quodammodò supplere videatur; quoniam vi sua Elastica naturalem Tensionis suæ statum recuperat, & eodem, quem tunc edit, nisu exteriori Membranæ *Tympani* ad statum naturalem Tensionis, & Figuræ suæ restituendæ conducit, cum hæc extremo fine *Manubrii Malleoli* premi cessat. Quemadmodum elatione Capitis *Malleoli* versus superiora extremitas *Manubrii* ejus parum deorsum inclinatur; sic etiam elatione *Incudis* versus superiora extremitas internæ Apophyseos illius paululum demittitur. Dixi modò elatione *Incudis* extremitatem internæ Apophyseos illius paululum solummodò demittit; quoniam *Incus* ita sita est in fovea, Ossi Marginem exteriorem Baseos Cavitatis *Tympani* formanti incisa, ut Corpus ejus sursum tolli nequeat, quin exterior illius Apophysis extremitate sua citò innitatur Ossi sibi subjuncto, à quo hæc parum distat. Hinc fit ut Musculus *Monogastricus* Auris longiore Tendine suo *Incudem* versus superiora multum erigere nequeat. Et superdictis clarè patet ut plurimum binas, & aliquando tres esse Causas Mechanicas propter quas Musculus *Monogastricus* longiore Tendine suo *Incudem* & Caput *Malleoli* paululum solummodò versus superiora tollit, adeoque internam Apophysin ipsiusmet *Incudis*, & Finem extremum *Manubrii Malleoli*, paululum tantummodo demittit.

Ubi Corpus *Incudis* parum sursum erigitur, interna illius Apophysis parum deorsum inclinatur, ut mox notatum fuit, & uno eodemque tempore Caput *Stapedis*, cui Lenticularis Ossis interjectu annectitur, secum trahit, adeoque parum quoque illud demittit. Dum Caput *Stapedis* parum deorsum inclinatur, necessariò superna Baseos *Stapedis* ejusdem à superna Fenestræ *Labyrinthi* parte, cui superjacet, nonnihil recedit, atque adeo illam paululum aperit, & quodammodò pulsât, si ita loqui fas sit. Ex his quæ modo dixi facile intelligitur Tendinem longiorem *Monogastrici* Auris Musculi Auditui faciliùs ac perfectiùs excitando bifariam conducere. Primum enim quatenus *Manubrii Malleoli* extremitate Membranam exteriorem *Tympani* tendit, & Superficiem illius planam, aut ferme planam, reddit, ea ratione qua supra, explicatum fuit, efficit ut Pororum ejus parietis nonnihil à se invicem diducantur, ac propterea Materia Ætherea, cum ad hanc Membranam appellit, incussis sibi ab Objectis Sonoris Impressionibus onusta, illos ita patentes reperit, ut eos *Tympani* Cavum ingressura faciliè permeet. Ubi vero *Tympani*
Cavum

Cavum ingressa est; levi suo Pondere, licet sibi minime incommòdo (prædictis scilicet impressionibus) in Ætheream sese exonerat Materiam, quæ inibi conclusi Aëris Poros replet, quæque illas in *Labyrinthum* per Januam & Fenestram illius transfert. Cum primum Objectorum Sonorum Impressiones ad interiora *Labyrinthi* pervenerunt; eæ ibi loci Spiritui Animalis intra diversas Nervi Mollioris Auris Propagines recondito, Æthereæque Materiâ gravidò, incutiuntur; Spiritus verò Animalis merum ipsarum Characterem ad Ovale Cerebri Centrum transmittit, ubi hanc excitat in Anima Ideam, qui ex placito Dei Optimi Maximi excitandæ aptus natus est. Secundò, longior Musculi *Monogastici* Auris Tendo Auditui facilius ac perfectius producendo inservit, videlicet quatenus eâ, qua supra explicatum fuit, ratione supernam Fenestræ *Labyrinthi* partem paululum aperit; quoniam, dum hæc aguntur, pars una Æthereæ Materiæ, incussas sibi ab Objectis Sonoris Impressiones secum vehens, secundum *Labyrinthi* vestibulum facilius ingreditur, dum pars altera primum subit.

Dum Musculus *Monogasticus* Auris contrahitur, is brevioris Tendine Caput *Malleoli* unà cum *Incude* versus seipsum parum oblique trahit. Hinc fit, ut extremitas Manubrii *Malleoli*, & Acumen Internæ Apophyseos *Incudis* ex Interioribus *Tympani* versus Exteriora necessariò inclinentur. Et verò, dum finis extremus Manubrii *Malleoli* è Cavo *Tympani* versus *Meatum Auditorium* inclipatur, hic necessariò convexam partem, cui annectitur, exterioris Membranæ *Tympani* deprimit, adeoque Naturali ejus Tensioni augendæ, nec non utrique illius superficiei planæ reddendæ, plurimùm conducit. Ubi pars acuminata internæ Apophyseos *Incudis* ex Interioribus *Tympani* versus exteriora inclinatur, ut supra dictum fuit, hæc necessario Caput *Stapedis* Offis lenticularis Interventum sibi annexum secum trahit, atque adeo partem lateralem internam Baseos hujusce Officuli à parte quoque laterali interna Fenestræ *Labyrinthi* nonnihil removet, & tunc Rimula interjicitur margini laterali ac interno Baseos *Stapedis* ipsius, & margini quoque laterali ac interno Fenestræ *Labyrinthi*, quæ Materiæ Æthereæ incussis sibi ab Objectis Sonoris Impressionibus onerata, ac velut obsignata, & *Labyrinthum* ingressuræ aditum, sed arctum sanè, in Concham præbet. Ex his, quæ jamjam dixi, clarè patet Binos Musculi *Monogastici* Auris Tendines iisdem Muniis obeundis dicatos esse; licet Motus eorum, utpote in diversas loci partes prorogati, diversimodè fiant, quin sibi tamen adversentur, ut ex supra dictis faciliè intelligi potest. Ac re quidem ipsa eorum unusquisque ratione sibi propria exteriorem Membranam *Tympani* tendit, planamque reddere nititur; atque adeò Materiæ Æthereæ incussas sibi ab Objectis Sonoris Impressiones secum vehenti aditum in Cavitatem *Tympani* expeditiorem reddit: Dum longior supernam Fenestræ *Labyrinthi* partem parum aperit, brevior ejusdem Fenestræ partem lateralem internam nonnihil recludit, quò Rimulâ tunc ibi loci factâ Æthereæ Materiæ aliqualis portio Concham subire queat.

Minor Musculus Auris Internæ, si Originis & Insertionis ejus ratio habeatur, in semetipsum contrahi non potest, quin *Stapedis* Caput, cui inferitur, ab exterioribus *Tympani* versus interiora trahat, atque adeò partem lateralem externam Fenestræ *Labyrinthi* parum aperiat, ut Materiæ Æthereæ aditum in Concham præbeat. Ex his clarissimè patet Musculum Minorem

Auris, de quo nunc, dum sese contrahit & Musculum *Monogasticum* spectatum quâ Tendine suo breviori agentem Fenestram *Labyrinthi* opposita prorsus ratione aperire. Hinc haud dubiè fit, ut propter oppositos Motus Naturales jamjam explicatos binorum ejusmodi Musculorum *Labyrinthi* Fenestra nunquam multùm aperiatur, imò & aperiatur tantùm per latus suum externum Musculo Minore agente. Contra verò hæc ipsa met Fenestra per superiora, & uno eodemque tempore per Latus suum internum recluditur, ubi Musculus *Monogasticus* sese contrahit, ut superius fusè atque nitide explanatum fuit.

Partes superius descriptas, quibus *Tympani* Cavum adornatur, muniis obeundis dicatas esse, quæ ab ipsis naturaliter præstari dixi, à nemine in dubium revocari potest; quandoquidem Auditus toties læditur, quoties naturalis illarum status immutatur: Neque tamen quempiam in hanc abire Sententiam velim, illas ad Auditum excitandum absolute necessarias esse; quia sæpe in Sectione Cadaverum Humanorum observavi externam ut & internam *Tympani* Membranam, imò & aliquando majorem Musculorum illius portionem desiderari; quoniam hæ partes acri Pure Abscessus modò in Foveolis Apophyseos *Mastoidis* & modò in Cavo ipsiusmet *Tympani* producti corruptæ, prorsusque consumptæ fuerant; & tamen in omnibus his Hominibus, quorum auris una vel altera, Abscessu Pus emittente laboraverat, *Auditio* in Aure affecta prorsus abolita non fuerat, ut ab illis, dum erant in Vivis, didici.

Adhuc mihi perpendendum superest, an bini Auris Internæ Musculi voluntariè, vel absque prævio ullo Voluntatis Actû, Motus illorum determinandi capace, moveantur. Re attentè, quantum fieri potuit, perpensâ, in hanc Sententiam non abire non potui, ejusmodi Musculorum Motum, utpote partim à Voluntate, partimve ab impressionibus Objectorum Sonororum, inscia, imò & aliquando reluctante Anima, determinatum, partim quoque voluntarium, & partim involuntarium esse. Ac re quidem ipsa verisimillimum est, hoc ipso Voluntatis Actû, quo ad aliquid facile atque clarè audiendum determinamur, Spiritum Animalem determinari ad fluendum versus Musculos de quibus mox dixi, ut Motum illorum promoveat, cujus ope rei Audiendæ Perceptio expeditius, & clarius fiat. Verumenimverò Musculorum Auris Internæ Motus merè Voluntarius dici nequit; cum nemo sit, qui propria Experientiâ persuasum non habeat illos præter Voluntatem sæpe moveri, ut jam dixi. Quæ cum ita sint, extrinsecam Causam, quæ Musculos Auris Internæ ad sese movendos determinat, nullam aliam excogitare licet quam Materiam Ætheream Objectorum Sonororum Impressionibus onustam. Et verò hujusmodi Causam ea, qua sequitur, ratione prædictos Musculos ad Motus suos obeundos excitare verisimillimum mihi videtur. Dum Materia Ætherea repetitis Vibrationibus suis, quæ sese modò citius modò tardius excipiunt, ad exterioriorem Membranam *Tympani* appellit, tota fere in concavam illius partem derivatur, & tum ad eam appellendo, tum ejus Poros subeundo, & permeando illam percutit, & versus Interiora Capitis protrudit. Ubi autem concava pars exterioris Membranz *Tympani* percutitur, & versus interiora Capitis protruditur, annexam sibi extremitatem Manubrii *Malleoli* è Mea-

in Auditorio versus Tympani Cavum pellit, sursumque erigit, & uno eodemque tempore Caput illius, eique alligatam *Incudem* deorsum inclinat. Dum Caput *Malleoli* & *Incus* deorsum inclinantur, binos Tendines Musculi *Monogastrici* Auris Internæ ad se trahunt, totumque Musculum extendunt, atque adeo illum ita disponunt, ut Vim Elasticam ipsius Contractioni promovendæ aptam acquirat. Verum, cum Vibrationes Aeris Ætherea Materia imprægnati, utut cito fiant & sese consequantur, exiguis quibusdam Temporis Intervallis, semper ab invicem distinguantur, certo certius esse mihi videtur & Temporis Intarvallo, quod inter primam, Exempli gratia, & Secundam Vibrationem intercedit, prædictum Musculum eâ, quam adeptus est, vi elastica, dum extensus fuit, lenique sua Extensione determinare ad sese contrahendum, & Spiritum Animalem avocandum, & reapse contrahi, juvante scilicet Spiritu Animali recens Motricium Fibrarum illius Poros ingresso. Contractus autem Musculus *Monogastricus Stapedem* ex Interioribus Tympani versus Exteriora pellit, & sic Musculum Minorem Auris Internæ extendit, & ita disponit, ut Vim Elasticam ipsi contrahendo aptam adipiscatur, cujus ope determinatur ad sese contrahendum, & revera contrahitur Spiritu Animali interveniente, statim atque Musculus *Monogastricus* rursus ea, quâ mox explicatum fuit, ratione iterum extenditur.

Partis alterius Internæ Auris, *Labyrinthi* scil. Exteriora & Interiora nunc lustranda veniunt, si prius dixerim Os, ex quo Interiores singularum ejus Cavitatum Parietes conflati sunt, album, durissimum, necnon maxime compactum esse. Id autem à Natura ita comparatum esse videtur, ut Materia Ætherea Sonorum Objectorum Impressionibus onusta, dum prædictis impingitur Parietibus, nihil aut saltem fere nihil Motus sui amittat, atque adeo illum qualem ab Objectis Sonoris accepit, talem aut saltem fere talem communicet Spiritui Animali contento intra Expansiones Rami Mollioris Nervorum Auris, quæ variis atque variis modis configuratæ variè atque variè Interiora *Labyrinthi* adornant.

In Exterioribus *Labyrinthi*, quem Omnipotens intra Petrosum Os excavavit, & nunquam satis mirando modo effinxit, tria tantum notatu digna sese offerunt; Osseum nempe Sepimentum, supernam ejus partem occupans, quo intermedio Ductus tres semicirculares illius ab invicem dissepiscuntur; & Aperturæ duæ non procul ab invicem distitæ, quæ Materiæ Æthereæ Aditum præbent à Tympani Cavo in *Labyrinthum*. Sepimentum hoc peculiare habet, quod Textum interius ejus quamplurimis Foveolis pervium sit, intra quas permultæ Capillares Vasorum Sanguiferorum Propagines disseminantur. Et verò Sanguis quem ejusmodi Vascula devehunt, miti Calore suo Naturalem fovet atque conservat Motum Spiritus Animalis in Poris Membranularum Nervearum intra Semicirculares *Labyrinthi* Ductus reconditarum hospitantis, atque adeo impedit nè supra modum condensetur, & Audivui excogitando ineptus evadat. Binæ Aperturæ in hac Offis Petrosi parte sunt excavatæ quæ *Labyrinthi* Basin constituit: Prima Figuram habet Ovale, & situs ejus paulò altior est quam situs Secundæ: Hæc *Labyrinthi* Fenestra nuncupanda mihi videtur; siquidem Conchæ ac proinde *Labyrinthi* Interioribus inhiat. Hanc Aperturam interioribus *Labyrinthi* inhiare non abs re dixi, cum hæc Parieti Conchæ incisa sit, quæ

pars illius est, cujus Interventu reliquas inter partes ejus interiores Communicatio quædam habetur, ut infra dicetur. Huicce Fenestræ *Stapedis* Basis applicatur, & illam claudit, quamdiu Auris Internæ Musculi otiantur; contra verò eam paululum recludit, quoties eorundem Musculorum alteruter in semetipsum contrahitur, ut supra explicatum fuit. Alteram binarum Aperturarum ferè rotundam *Labyrinthi* Januam appello; quoniam hæc Aditum præbet in parvam Cavitatem ferè rotundam, qua itur ad *Labyrinthum*. Etenim parva hæcce Cavitas cum Cochleæ extremitate Ductus semi-ovalis spiralis illius, & cum Concha Rimulâ Basi ejus incisâ, atque adeo cum Ductibus semi-circularibus in sequentibus describendis communicat, ut postmodum explicabitur. Quæ cum ita sint, prædictam Aperturam Januæ *Labyrinthi* nomine jure, meritoque à me insignitam esse nemo non videt. Janua ista Membranulâ tenuissimâ velatur, & obturatur, quæ utpotè rarissimam habens Texturam Æthereæ Materiæ Objectorum Sonororum Impressiones secum vehenti facilem in *Labyrinthum* Aditum præbet.

Cavitatem istam exiguam retro Januam *Labyrinthi*, Primum illius Vestibulum nominari posse mihi videtur; cum hæc eat ad Cochleam, & Concham à Clariss. D. Du Verney Vestibulum *Labyrinthi* nominatam. Ita ut tres semi-circulares *Labyrinthi* Ductus, & Cochlea, sint veluti bini ejus Andrones ab invicem Conchâ distincti, & tamen ejus Interjectu simul communicantes; proptereaque illam Secundum *Labyrinthi* Vestibulum nuncupo. Tenuissima hæc Membrana, quam *Labyrinthi* Januam obturare superius dixi, in Primum illius Vestibulum exporrigitur, totamque superficiem ejus interiorem co-operit, proindeque extrinsecus claudit Rimulam Basi Conchæ incisam, & Cochleæ Finem extremum; ita ut hæc adhærescat tenuissimis Membranis Nerveis Conchæ, & Cochleæ interiora occupantibus, earumque Interventu cum Ramo Molliori Nervorum auris communicer. Vestibulum Secundum, quod idem ac Concha Veterum Omnium Anatomicorum sonat, multo magis amplum est quàm Primum; Cavitas ejus pene rotunda duarum circiter linearum Diametrum habet; ita ut duo fere Tritici grana in tres vel quatuor portiunculas divisa in Adultis continere possit, ut aliquoties expertus fui: In ea novem observantur Aperturæ; binæ nempe Foramina exigua, peneque insensibilia, quæ in ipsam aditum præbent binis propaginibus exiguis Rami Mollioris Nervorum Auris inferioris describendis; Rimula sat longa, nonnihil flexata Basi ejus incisâ; Ovalis Apertura in Pariete illius *Tympani* Cavum respiciente sculpta, & ab Antiquis Anatomicis Fenestra Ovalis nuncupata; & Ostiola trium Ductuum semicircularium, quæ quinque tantum sunt; quoniam Ductus semicircularis superior, qua scilicet parte Capitis posteriora respicit, inferiori cum Ductu semicirculari ita coit, ut ambo sibi communi Ostiolo unico Conchæ interioribus inhient. Hinc fit, ut Ostiolum istud unâ cum recentioribus Anatomicis Portam Communem nuncupem. Singula Ductuum trium semicircularium Ostiola ita configurata sunt, ut Ostium finem extremum Tubæ occupans quadantenus referant. Ac re quidem ipsa semicircularium ejusmodi Ductuum Cavitatem, si attente quantum par est exploretur, à media sui parte sensim ampliorem fieri ad binas usque suas extremitates Oculis clarè patet, ac proinde illam ea ferè ratione utrinque

que finiri oportet, quā Tubæ cavitas finitur : Hæc de quibus nunc sermo habetur Ostiola ita disposita sunt, ut duo summam, & duo imam Conchæ partem occupent ; quintum verò sit prope Rimulam ipsiusmet Conchæ Basi incisam situm est.

In hoc Secundi Vestibuli *Labyrinthi* latere, quod exteriora Capitis respicit, exigui tres sunt Canales rotundi, quos, utpotè in semicirculum inflexos, una cum Recentioribus Anatomicis Semicirculares appello. Et verò ut Canales isti ab invicem distingui possint, illis distincta Nomina ab eorum situ desumpta tribuam : Primum Superiorem nuncupabo, quod arcuatum Conchæ Laquear circumdet ; Secundum Inferiorem, quod imas ejusdem Laquearis Conchæ partes cingat ; Tertium verò, quippe qui inter Primum & Secundum situs est, Medium nominabo. Semicircularis Ductus Superior, cum primum è Vestibulo prodiit, sursum tendit, sursumque tendendo paululum in semetipsum inflectitur ; ubi vero paulo plusquam dimidium Circulum descripsit, & ad medium usque Posticæ Ossis petrosi partis sese parum incurvando exporrectus fuit, inferiori committitur Canali, ut mox dicetur. Semicircularis Ductus Inferior, ex ima Conchæ parte prodit, & decurso paulo majori quam dimidii Circuli spatio, Ductui semicirculari Superiori adjungitur, ut modo dixi ; itaque bini Ductus isti in unum planè coalescunt, qui oblique protenditur, donec in Portam Communem desinit. Semicircularis Ductus Medius separata duo habet Ostiola, nec plusquam semicirculum describit. Ductus isti, quorum superficies interior valdè lævigata est, ut plurimum interius rotundi sunt, & aliquando Figuram Ovalem imitantur.

In hoc Secundi Vestibuli *Labyrinthi* latere, quod tribus Ductibus semicircularibus oppositum est, & Capitis interiora respicit, alterum *Labyrinthi* Andronem Cochleam dictum, collocavit Natura. Cochleam in binis divido partes, quarum prima Cochleæ nomen retinet, & Cavitatem habet, quæ lentem crassiorē facile admittere posset : altera vero pars Ductus semiovalis Spiralis dicitur. Hæc Rami Mollioris Nervorum Auris portione, quæ per Cochleam disseminatur, exempta, osseum Mediæ illis Basi adnatum Corpus observatur Lineâ circiter unâ longum, in spiram dispositum, & quadantenus Pyramidale, ac proinde Nucleus Pyramidalis Cochleæ nuncupatum. Hicce Cochleæ Nucleus circa mediam sui partem lateralem Capitis Interiora respicientem tenui laminâ osseâ pellucidâ innititur, quæ marginem Ostii Ductus semi-ovalis spiralis partim constituit, imo & latus internum Secundi Gyri Laminæ Spiralis prædicto Nucleo Pyramidali circumductæ partim format ; ita ut Secundus ille Gyrus Laminæ Spiralis de qua jam dixi, partim Osseus, partimve Nervus sit. Intra Medium Nuclei Pyramidalis Textum unum excavatum est Foramen valde sensibile. Non procul ab Acumine Nuclei Pyramidalis jamjam descripti tenuissima in Adultis observatur Prominentia Ossea in Orbem disposita, & quarta circiter Lineæ unius parte lata, quæ Superficie internæ Cavitatis Cochleæ adnata est, proindeque illam Apophysin Orbicularem Cochleæ appello. In Medio osse Cochleæ extremitatem formante una excavata est Foveola. Cæterum tota superficies interior Cochleæ valdè lævigata est, & si Microscopii interpositu inspicatur,

ciatur, quamplurimis Foraminibus exiguis pervia apparet, potissimum in ea parte, quæ Nuclei Pyramidalis Basi circumjacet. Secunda Cochleæ pars est Ductus semi-ovalis Spiralis, ut supra notatum, qui à Basi Cochleæ, ubi suum habet initium, ad supernam Primi Vestibuli *Labyrinthi* partem, & Rimulam usque Basi Secundi incisam protenditur: Cavitas ejus ita conformatur, ut in semi-ovalem spiram disponatur, & circa finem paulo latior sit, quam circa initium: Hac Rami Mollioris Nervorum Auris portione semota quæ per eam disseminatur, in illa Processus Osseus tenuissimus observatur, qui à latere interno Baseos Nuclei Pyramidalis Cochleæ ad extremitatem usque illius porrigitur. Hunc processum Osseum, utpote minimum, Lineam Osseam Ductus Semi-ovalis spiralis Cochleæ nominare lubet. De cætero, tota Superficies interior ejusmodi Ductus exiguis pluribus Foraminibus pervia valde lævigata est, si hanc partem illius exceperitis, in qua Linea Ossea, de qua supra, prominet.

Ramus Mollior Nervorum Septimæ Conjugationis Ramo Duriore crassior, licet multò pauciores quam ille Fibras Medullares à Processu Annulari recipiat, Internum Auris Ductum ingressus in tres dividitur Ramulos; Superiorem nempe, Infimum, & Medium. Superior Conchæ Cavitatem subit per Foramen peculiare supernæ illius parti incisum; ibique in Membranam tenuissimam rarissimam nec non mollissimam explicatur, quæ totam ejus Superficiem co-operit, si Fibrillam illius excipiat retinentem Formam Nervuli qui innititur & adhæret exiguæ Apophysi Osseæ nonnihil acuminatæ marginem internum supra notati Foraminis occupanti, & ob superficiem suam parum inæqualem, Nerveæque Membranæ albicante jamjam descriptæ co-opertam exiguum Apicem album quadantenus æmulanti. Nervulus ille Mollissimus tenerrimusque Arteriolam & Venulam Comites habens, quæ latera illius occupant & immediate tangunt, ubi secedit ex Apophysi Ossea, cui eum innixum & adhærentem esse modo dixi, Mediam Conchæ Cavitatem instar Funiculi tensi decurrit, & ad latus usque Portæ Ductui semicirculari Superiori, & Ductui Semicirculari Inferiori communis porrigitur, eique adhærescit, ac deinceps Portam Communem subit, eamque subeundo in binas expanditur Membranulas, quarum una superficiei Interiori Cavitatis Ductus semicircularis Superioris, & altera interiori quoque superficiei Cavitatis Ductus Semicircularis Inferioris, supersternitur. Infimus ac Minimus Rami Mollioris Nervorum Septimi Paris Ramulus unâ aut alterâ pene insensibili Fibrillâ emissâ, quæ disseminatur intra Textum interius hujus Ossis Petroso partis intra quam Semicirculares *Labyrinthi* Ductus excavati sunt, per exiguum Foramen subit, cujus interventu in infimam Conchæ partem sese insinuat, & inibi explicatum tenui huic Membranæ formandæ impenditur, quam interiori Conchæ ipsius superficiei superstratam esse supra dixi, si portiunculam illius exceperitis, quæ Ductum semicircularem Medium ingreditur per Foramen situm paulo subius Portam Communem, de qua superius, ibique in Membranulam tenuissimam expanditur, quæ Interiori Ductus illius superficiei supersternitur. Nerveæ Membranulæ tenuissimæ Interiora Ductuum semicircularium *Labyrinthi* occupantes irrigantur Vasis sanguiferis exiguis, & ut plurimum Oculorum Aciem fugientibus, dum scilicet nullum, vel paucissi-

paucissimum tantum sanguinem intra perexiguas Cavitates suas continent. Ipsæmet Membranulæ, utpote limpidissimo ac subtilissimo liquore spirituosissimo imbutæ, præsertim in recens natis, aded Molles sunt, ut vix tangi possint, quin dilacerentur, utut leviter Instrumento quovis tangantur. Præterea illæ, si Radiis Solaribus excalescæto Aëri exponantur, citissime exsiccantur, & ita friabiles evadunt, ut, si è sede sua dimoveantur, in frustula minima dividantur, terantur, & redigantur in Pulverem subtilissimum qui facillimè tenues evanescit in Auras. Limpidissimus pariter Liquor spirituosus, quo Membranulas, de quibus nunc, semper imbutas esse dixi, & qui nihil aliud esse videtur quàm spiritus Animalis ob nativam loci quem occupat Frigiditatem nonnihil condensatus, ferè momento citius dissipatur, postquam ductus semicirculares *Labyrinthi* aperti fuerunt, quos in recens natis ejusmodi Liquore semper repletos Observavi. Hoc autem aliter sese haberet necessa id, si quinque Ostiola, quibus Semicirculares *Labyrinthi* Ductus Interioribus Conchæ inhiant, Membranæ Nerveæ superius descripta naturaliter obturata non essent. Nequaquam tamen dubitandum mihi videtur, quin Liquor, de quo modò locutus sum, Membranæ Nerveæ Conchæ poros sensim sine sensu subeat, & impediat ne supra modum exsiccetur: hinc fit ut nativam illius Temperiem conservet; quæ scilicet Auditui excitando conducit. Ex supra dictis patet incisam Conchæ Basi Rimulam, & Ovalet illius Fenestram, ut & quinque Ostiola Ductuum trium semicircularium *Labyrinthi* Nerveæ tenuissimæque Membranæ obturari, quæ Conchæ Interiori occupat, ut supra dixi.

Medius Rami Mollioris Nervorum Septimi Paris Ramulus juxta hanc Offis Petrosi partem, quæ Basis est Nuclei Pyramidalis Cochleæ, plures emittit Fibrillas, quæ cum primum Cochleam ingressæ sunt Arteriolis & Venulis comitatæ suam inibi formam mutant, & sequenti ratione disponuntur, atque distribuuntur: Imprimis tenuis illarum Membrana, quam Piæ Meningi acceptam referunt, ita explicatur ut desinat in Membranulam tenuissimam, & numerosissimis Vasculis sanguiferis irrigatam, quæ primò co-operit superficiem Bases Nuclei Pyramidalis Cochleæ, & quicquid ab illa usque ad Secundum gyrum laminæ Spiralis ipsiusmet Nuclei Pyramidalis continetur, ac deinceps in ductum Semi-ovalem Spiralem ejusdem Cochleæ porrigitur, & ita expanditur, ut finem illius extremum obturet, & totam ejus superficiem, imò & utrumque latus Laminæ Spiralis semi-ovalis inibi reconditæ obducatur. Et verò hæc Membrana, cum tenuissimæ rarissimæque Texturæ sit, non impedit quo minus Materia Ætherea continuè & expeditè è *Tympano* in *Labyrinthum*, singulosque illius recessus transeat, licet Ductus Semi-ovalis Spiralis Cochleæ finem extremum obturet, ut supra notatum. Hinc fit ut sita retrò *Labyrinthi* Januam Cavitate ad *Labyrinthum* ipsum iri supra dixerim. Quod attinet ad Substantiam Medullarem Fibrillarum Nervearum, de quibus nunc sermo habetur, hujus portio una impenditur formando Secundo Gyro Laminæ spiralis Nucleo Pyramidali Cochleæ circumductæ, cujus scilicet Gyri latus internum merè Osseum est, ut superius insinuavi; altera vero portio Initium ejusdem Laminæ Spiralis primùm format, quod in dimidio tantum Gyro merè Nerveo consistit, ac deinceps in ductum Semi-ovalem Spira-

Spiralem Cochleæ porrecta definit in Laminam Spiralem Semi-ovalem verè Nerveam, quæ inibi reconditur, quæque crassiore sui parte Lineæ Offeæ hujusce Ductus adhærescit. Ita ut initium Laminæ Spiralis Nuclei Pyramidalis Cochleæ sit etiam initium Laminæ Spiralis Semi-ovalis, quam modò descripsi. Ejusmodi autem Lamina Spiralis Semi-ovalis ad extremum usque finem Ductus, intra quem latitat, exporrecta nonnihil acuminata extremitate sua mediæ parti Rimulæ Basi Conchæ incisa adhærescit, adeoque ejusmodi Ductum in partes binas dispescit, inter quas nulla est sensibilis communicatio : Binæ istæ partes Ductus Semi-ovalis Spiralis Cochleæ ita dispositæ sunt, ut prima, quæ Capitis Interiora respicit, cum Primo & Secundo Vestibulo *Labyrinthi* communicationem habeat : Secunda verò *Tympanum*, proindeque Capitis Exteriora respiciens, cum Concha tantum communicet. Medius Rami Mollioris Nervorum Septimi Paris Ramulus, Fibrillis tenuissimis modò descriptis emissis, foramen exiguum intra medium textum Nuclei Pyramidalis Cochleæ incisum subit, Arteriolam Venulamque Comites habens, &, cum primum ex illo egressus est, tenuissima ejus Membrana ita explicatur, ut co operiat quicquid à secundo Gyro Laminæ Spiralis Nuclei Pyramidalis Cochleæ partim Osseo & partim Nerveo, ut supra dictum, usque ad extremitatem ejusdem Cochleæ continetur ; Medullaris verò illius Substantia definit in tertium Gyrum totum Nerveum Laminæ Spiralis, de qua mox dixi, qui circumferentiâ suâ innititur, & adhæret Apophysi Orbiculari Cochleæ ; demumque pars illius extrema in Membranulam expanditur, quæ undequaque paululum in semetipsam inflexa margini Foveolæ in media extremitate Cochleæ excavatæ applicatur, & adhærescit, atque adeo parvam format cavitatem exiguum Poculum clausum imitantem, cui innatus tantum Aër inest.

Ex jam dictis patet Laminam Spiralem intra Cochleam reconditam dimidio uno Gyro, & Gyris duobus integris solummodo constare, qui exiguis cavitatibus innato Aëre repletis, inter quas nulla est sensibilis communicatio, ab invicem distinguuntur. Hic notandum venit, quod Lamina Spiralis Nucleo Pyramidali Cochleæ circumducta, & Lamina Spiralis Semi-ovalis intra Ductum Semi-ovalem Spiralem ejusdem Cochleæ recondita, ut & Membranulæ Nerveæ interiori superficiei Ductuum trium Semicircularium superstratæ Succo limpidissimo Spirituoso, præsertim in recens natis, imbutæ sunt, qui apertâ Cochleâ visu deprehenditur, & citissime dissipatur. Interior verò, seu Medullaris ac verè Nervea Substantia prædictarum Laminarum brevi exsiccatur, & valdè friabilis evadit, si calido Aëri exponatur, ut supra notatum.

Ex iis, quæ modò dixi de Ramo Molliore Nervorum Septimæ Conjugationis, facile intelligi posse mihi videtur binas superius descriptas Laminas Spiralis Nerveas unâ cum tenuissimis Nerveis Conchæ, & Ductuum trium Semicircularium interiora occupantibus immediatum atque completum Auditus Organum constituere ; adeo ut pro diversis Motibus, qui in eo, quem proprios intra Poros recondunt, Spiritu Animali ab Objectis prædicti Sensus excitantur, & communi Sensorio communicantur, diversæ in Anima Soni Idææ producantur.

XIX. 1. M. *Du Verney* has observ'd that the Cavities of the Nose are fill'd with many Cartilaginous *Lamines* distinct one from another; every *Lamine* being divided into many others, all folded almost into a Spiral Line. And that the *Os Cibrosum* is made up of the Extremities of these *Lamines*, which butt upon the Root of the Nose, the Holes wherewith it is pierc'd being the Intervals between the *Lamines*. They are design'd to uphold the inner Tunick of the Nose; which Tunick, being a principal Organ of Smelling, hath receiv'd from Nature a very great Expansion, being fold-ed round about together with these *Lamines*, that by this industrious Mechanism she may employ all its Length in a very little Room. This Tunick is fill'd with an innumerable Company of small Rays, so many Branches of Arteries and Veins, and especially Nerves, by which it hath a most exquisite Sense: By its great Expansion, a greater Number of the subtile Particles of Odorant Bodies strike it at the same time, and so render their Impression more strong; and by the Labyrinth, made by the Windings of the *Lamellæ*, they are arrested and make a longer stay before they pass off from thence into the Breast. For the same Reason Nature has furnish'd the said Tunick of the Nose with a great many small Glands, which open thereinto; and so moisten it with a thick and slimy Exudation, the better to intangle the dry odorant Particles.

The Structure of the Nose; by M. du Verney. n. 139-p. 976.

This Tunick being compar'd in several Animal shews much of the Reason of the Delicacy of Smelling in some, above what it is in others. For look how much a finer Nose it is that Animals have, they have likewise so much a greater Number of these *Lamellæ*, wherewith the same Tunick is roll'd up in so many more Folds. So the Nose of a Hound is better furnish'd with them than that of any other Animals. The Hare, Fox, Cat, Wild-Boar, have a considerable Number of them. Those Animals that chew the Cud have fewer. And Man is less provided for than any of the Rest.

2. Not only the Number, but the Length also of the *Lamellæ*, is of great Use for the Strength of Smelling: For which Purpose most Quadrupeds which either Hunt, as the *Carnivorous*, or distinguish their Food by the Smell, as the *Graminivorous*, have their Nose not plac'd in the middle of the Face, as in Man, but prolong'd to the very End.

*By 3
ib. p. 977.*

XX. 1. In *June* 1684, I was call'd to a Patient who had a *Polypus* in the right Nostril. I drew it out without Pain, or any bad Accident: But after this Extraction, she felt some Trouble in her Nose, and Moisture did pass with Difficulty from the Nose to the Throat. This engag'd me, seeing no more in the Nostrils, to look into the Mouth, where I perceiv'd behind the *Uvula*, a strange Body of the Bigness of half a Nut, which I judg'd to be a Portion of the same *Polypus*: And being encourag'd by the Advice of M. *Fede* and M. *Vary*, I pull'd it out in their Presence. We found it of an extraordinary Shape, the Piece by which I laid hold of it was hard, and of a dark Brown; it was fasten'd by two Branches, which seem'd to have taken their Shape in the Nose, being each of them as

The Original of a Polypus, by M. Giles, n. 226. p. 472.

big as a sweet Almond, but their Substance was softer and whiter; it had also a little Stalk something Red, of the Bigness of a Cherry-stalk. There was not a Drop of Blood spilt, and the Patient felt no Pain in the Operation; all Trouble was remov'd, and the Liquor pass'd easily.

At the End of two Years the Patient dy'd of a Malignant Fever; and for as much as some time before her Death, she complain'd of a new Trouble in her Nose, we obtain'd leave to open this Organ. After we had broken the Bone, we found nothing in all the Nose but a little piece of Flesh very soft, which came out of a Cleft of the *Processus Pterygoïdes*; we follow'd it exactly, which brought us into the *Sinus* of the Upper Jaw; we broke this Bone also, and perceiv'd in this *Sinus* a rosy and clear Humour; in the middle of which there was a Body like in Figure, Consistence and Colour, to a greater one, which we had before taken out; we took Notice also of a little Red Speck, which seem'd to be the Root of this *Polypus*.

By
ib. p. 473.

2. The *Polypuses* are spongy Excrecencies, which, according to Authors, are form'd upon the Membrane that covers the Nose within, by some Alteration made there: Some are form'd also in other Parts, as in the Cavities of the great Veins. But this Membrane is more dispos'd to the Production of them than others, because it is the most spongy of the whole Body, and most full of Blood-Vessels. When these Excrecencies appear very Red and full of Blood, the Extirpation of them is dangerous, for Fear of an *Hæmorrhagie*, which is not so easily stopp'd: Therefore some do use Causticks of several Sorts with good Success.

The Organ of
Taste; by S. Mal-
pighi, n. 27. p. 492.

XXI. 1. S. *Malpighi* has discover'd in the Tongue many little Eminencies, which he calls *Papillary*, and believes to be the principal Organ of Taste.

By S. Fracassati, ib.

2. S. *Fracassati* observes, That as the Tongue hath towards its Point many Eminencies, by the Means whereof it goes, as it were, to meet Objects of Taste, so on the contrary, it hath many Cavities towards its Root, wherein it receives them. All which Cavities terminate in Nerves, and seem to serve for Funnel's to convey the Aliment into them. Which makes the Author think it very probable, that the finest Part of the Aliment passeth immediately from the Tongue into the Nerves, whence it comes to pass, that Wine, being taken into the Mouth restoreth Vigour presently.

A New Saliv-
al Duct disco-
vered; by Casp.
Barcholine, n. 104.
p. 749.

XXII. *Glanduæ omnes, quæ Oris cavitati Salivam subministrant, & ejusdem generis Vasa Excretoria in Os emittunt, numero Vasorum distincta accuratissime proponuntur à Stenonio in observationibus Anatomicis de Glandulis Oris. Quædam enim unico duntaxat Excretorio Vase prædite sunt, quædam pluribus. Illa Vasa, quæ numero plura, sed exigua in Oris cavitatem confluent, propria sunt iis Glandulis, quæ variè sparæ reperiuntur in Buccis, sub Lingua, in Palato, & Tonsillis. Vasa vero majora, quæ à Glandulis Conglomeratis unico prodeunt Cånali, hætenus saltem duo utrinque innotuerunt, quorum primum Superius est à Parotide*

tide Conglomerata ortum & à *Stenonio* inventum atque descriptum : Secundum vero Inferius, cujus primam delineationem *Warthoni* Diligentia debemus, quod à Glandula Maxillari inferiori provenit. Sed duobus illis hæcenus descriptis Vasis tertium, ejusdem plane generis, addi debet, Mihi Primo Observatum A. 1682. 13. *Martii*, quodque Inferius etiam dici meretur, quippe à sublinguali Glandula ortum, *Warthoni* Ductum comitatur, & sub Lingua eodem quo *Warthonianus* loco aperitur, Ostio æque manifesto. Etenim cum in Capite Vitulino extremitate Styli inquirerem & prosequerem Ductum à Glandula Maxillari Inferiori progredientem à *Warthone* descriptum, forte in alium Ductum adactus Stylus aperuit ea quæ mihi ante ignota erant. Credideram enim eundem Ductum me ad *Warthonianam* Glandulam perducturum, & ecce eo loco, circa mediam scilicet Linguae longitudinem, ubi *Warthonus* Ductum suum Salivalem à Linguae lateribus, nimirum in inferiore ejus parte, Cute & Pinguedine Glandulosa tegi dicit, ferebatur hic Ductus ad aliam Glandulam è Conglomeratarum genere, quæ proximè accumbit iis Glandulis, à quibus oriuntur Ductus illi Salivales qui Sublingualium nomine describuntur à *Stenonio*. Etenim illa Glandula (quæ in nonnullis Animalibus Glandula Maxillari Inferiori propius adjacet, & majuscula est; in aliis vero minor & magis versus extremitatem Maxillæ Inferioris sita) uti ejusdem plane Structuræ est, ac Maxillaris illa *Warthoniana* Inferior, ita etiam simile plane Vas Excretorium habet satis conspicuum, cujus Ductus Laterales ab omnibus Glandulae Glomeraminibus orti, in medio communem & satis capacem Truncum habent, qui Ductu recto comitatur illum alterum à *Warthone* descriptum & in tra Gingivas in Maxillæ Inferioris extremitate, inter Papillas quasdam compressas & rigidas, Maxillæ pertinaciter adherentes, in Os aperitur.

Talis primo mihi tunc temporis obtulit se Ductus ille cum sua Glandula in Vitulini Capitis examine : confirmata deinde sæpius est hæc Observatio in aliis Animalibus. In Ove, in ipsis illis Papillis, sub Lingua in inferiori Maxilla conspicuis, terminatur extremitas hujus Ductus, juxta quam etiam simili modo in eadem Papilla hiat Ostium Ductus *Warthoniani*. In Urso utrinque prope Linguae Frænulum sua cujuslibet Ductus Ostium Papilla eminet. In Leæna, quam nuper Indulgentia Augustissimi Regis nostri Theatro Anatomico concessam habuimus, itidem ad Linguae Frænulum exeunt quidem utriusque Ductus Ostia, sed ita ut sibi quasi peculiare quoddam Frænulum habeant à Tunica Oris interiori efformatum. Ipsa autem Glandula cui Originem debet Ductus noster, in Principe hoc Animalium, major est & oblongiuscula, atque altera sui parte pertingens usque ad Glandulam *Warthonianam*, atque uti variis constat Glandularum Glomeraminibus, ita ex iis provenientes variae Ramificationes emittuntur ad communem Ductum, qui ex minoribus allis extra Glandulam coalescit, & recto tramite *Warthonianum* ad exitum comitatur. Similem etiam distributionem & exitum eorundem Vasorum, atque eodem fere modo sitas & conformatas Glandulas nuper deprehendimus in Lynce. Et ut singula fiant illustriora addimus duas Figuras, Ex Anatome Leænæ desumptas, progressumatque Exitum Ductus hujus indicantes,

Explication of
the Figures
Fig. 6.

Prior Figura, Exprimit Glandulam Maxillarem Inferiorem A, cum Ductu Salivali Warthoniano B B, simulque vicinam Glandulam Sublingualem C, cum Ductu suo Salivali D, jam primum à nobis descripto, cujus variae Ramificationes per totam Glandulam dispersæ conspiciuntur.

Fig. 7.

Figura Altera, indicat duo utrinque Ostia Ductuum Salivalium Inferiorum, Warthoniani nempe & Nostri, quorum locum sub Lingua designant extremitates Stylosum *a a a a*, per dicta Ostia exeuntium sub Lingua *b*, quæ hic paulisper revulsa cernitur à Maxilla inferiori *c*, ut singula rectius pateant.

XXIII. Accounts of Books and Additions omitted?

- n. 22. p. 397. 1. **A** Natome Medullæ Spinalis, & Nervorum inde provenientium; *Gerardi Blasii*. M. D.
- n. 29. p. 553. 2. *Tetras Anatomicarum Epistolarum, Marcelli Malpighii & Caroli Fracassati, de Lingua & Cerebro; Bononiæ.*
- n. 64. p. 2081. 3. *Franc. Jof. Burrbi Epistolæ duæ ad Thomum Bartholinum.* Hafniæ. 1669. in 4^o.
- n. 174. p. 1144. 4. *Raymundi Vieussens, M. D. Mönspeliensis, Neurographia Universalis.* Lugd. 1685. in Fol.
- n. 215. p. 32. 5. The Anatomy of the Brain, containing its Mechanism and Physiology, together with some new Discoveries and Corrections of Ancient and Modern Authors upon that Subject: To which is annex'd, a particular Account of Animal Functions and Muscular Motion; by *Hen. Ridly*, M. D.
- n. 31. p. 600. 6. *Pathologiæ Cerebri & Nervosi Generis Specimen: In quo agitur de Morbis Convulsivis & Scorbuto; Studio Thomæ Willis.* M. D.
- n. 67. p. 2059. 7. *Antonii Molinetti Dissertations Anatomicæ & Pathologicæ de Sensibus & eorum Organis; Patavii.* 1669. in 4^o.
- n. 129. p. 746. 8. *Ophthalmographia, sive Oculi ejusque partium Descriptio Anatomica: Cui accessit Nova Visionis Theoria, Regiæ Societati Lond. proposita per Guil Briggs, M. D. Editio altera.* 1685. in 8^o. *The Theory of Vision, and the continuation of that Discourse, were at first inserted in these Papers in English: But the Author, a few Years after, Translated them into Latin, and annex'd them to his Ophthalmographia (in this Second Edition) to which they properly belong.*
- n. 175. p. 1186. 9. 1. A new Discovery touching Vision; in an Epistle of the Discoverer M. L'Abbe Mariotte of Lyons to M. Pecquet, and the Answer to it. *The Substance of both is here inserted in English.*
- Ph. Col. n. 6. p. 167. 2. The Answer of M. Mariotte to M. Pecquet, about the Opinion that the Choroides is the Principal Organ of Sight; *Englished and inserted here.*
- n. 147. p. 171. 3. M. Mariotte of Vision.
- n. 35. p. 668. 4. Two Letters of M. Pérault, and M. Mariotte; concerning Vision. *Paris.* 1682.
- n. 59. p. 1023. 10. *Traité de l'Organe de l'Ouïe par M. du Verney.* *Paris.* in 8^o.
- n. 74. p. 2217. 11. *Gustus Organum, per Laurentium Bellini, novissimè deprehensum.*
- n. 149. p. 255. 12. *Ant. Nuck de Ductu Salivali novo, Saliva, Ductibus Aquosis, & Humore Aquoso.* *Lugd. Bat.* 1686.
- ib. p. 259. 12. *Ant. Nuck de Ductu Salivali novo, Saliva, Ductibus Aquosis, & Humore Aquoso.* *Lugd. Bat.* 1686.
- n. 2. p. 366.
- n. 177. p. 1244.

C H A P. III.

The Neck. The Thorax.

SITTING in some Company, and having been but a little before Musical, I chanc'd to take Notice that in ordinary Discourse, Words were spoken in perfect Notes, and that some of the Company used Eights, some Fifths, and some Thirds: And that his Discourse, which was most pleasing, his Words, as to their Tone, consisted most of Concords; and were of Discords, of such as made up Harmony. The same Person was the most Affable, Pleasant, and the best Natur'd in the Company. This suggests a Reason, why many Discourses which one Hears with much Pleasure, when they come to be read scarce seem the same Things.

From this Difference of Musick in Speech, we may conjecture that of Tempers. We know, the *Dorick Mood* sounds Gravity and Sobriety; the *Lydian*, Buxomness and Freedom; the *Aolique*, sweet Stillness, and quiet Composure; the *Phrygian*, Jollity and Youthful Levity; the *Ionique*, is a stiller of Storms and Disturbances arising from Passion. And why may we not reasonably suppose, that those whose Speech naturally runs into the Notes peculiar to any of these *Moods*, are likewise in Nature hereunto congenerous? So also from the *Cliff*; as he that speaks in *Gamut*, to be Manly; *C Faut*, may shew one to be an ordinary Capacity, tho' good Disposition; *G Sol Re ut*, to be Peevish and Effeminate, and of a Weak and Timorous Spirit; *Sharps*, an Effeminate, *Flats*, a Manly or Melancholick Sadness. He who hath a Voice which will, in some Measure, agree with all *Cliffs*, to be of good Parts, and fit for variety of Employments, yet somewhat of an Inconstant Nature. Likewise from the *Times*; so *Semibriefs*, may speak a Temper Dull and Flegmatick; *Minums*, Grave and Serious; *Crotchets*, a prompt Wit; *Quavers*, vehemency of Passion, and Scolds use them; *Semi brief-Rest*, may denote one either stupid, or fuller of Thoughts than he can utter; *Minum-Rest*, one that deliberates; *Crochet-Rest*, one in a Passion: So that from the Natural Use of *Mood*, *Note*, and *Time*, we may collect Dispositions.

II. *Laryngotomy* is highly to be valu'd, for that in the greatest Extremity when a Man is in most imminent danger of Suffocation, and to all appearance within a very few Minutes of his last, by opening a new Passage for Breath, it gives speedy and certain Relief, and this when all other Methods fail; and without any considerable Injury from the Instrument. The Patient in a Minute or two, is brought from the Struggles of Death, to a State of Complacency, Ease, and Security. In the large Field of practical Physick, perhaps there is not any one Method that works so great a Change for the better in so short a Time. But we find this Operation very seldom practised,

A Conjecture as to Dispositions from the Modulations of the Voice; by n. 140. p. 10117.

An Argument for the Use of Laryngotomy; by Dr. Will. Mufgrave. n. 258. p. 398.

practised, because that Gap which appears on the Cutting a Throat, (the divided Parts being then drawn to their other more fix'd Ends; together with the great Efflux of Blood, when the Jugulars and Carotid Arteries are also wounded, creates in most Men a Dread of this butcherly Operation; and make those, especially who are unacquainted with *Anatomy*, suspect all Wounds of the *Trachea*, as Mortal, and oppose *Laryngotomy* under all the most urgent Circumstances.

L^h. 2. c. 4.

But to wipe off this Prejudice, it may be affirm'd, That *Laryngotomy* is allowable and ought to be put in practice in violent *Squinzies*, and other Dangers of Suffocation from Causes of a like Nature with them. For that the Wound is Curable (notwithstanding the Authority of the *Encyclopædia Chirurgica* to the contrary) will appear by the following Relation sent by Mr. J. Keen of *Roch* in *Cornwall*, the Chirurgion, who perform'd the Cure.

Nicholas Habb, of *St. Enodor* in *Cornwall*, aged 93 or thereabout, was some time in *March* 1696, at a Distance from my House, set on by *Ruffians*, who first by a Blow on the *Occiput* knock'd him to the Ground; then transected the *Trachea* somewhat beneath the *Pomum Adami*, together with several of the Adjacent Muscles, and some large Blood Vessels; from which he lost a very great Quantity of Blood, seen afterwards lying on the Ground. The *Ruffians* having robb'd him, and thinking him either dead, or past all Recovery, left him. After some time the wounded Man recover'd so much Sense and Strength as to thrust his Neckcloth into the large and gaping Wound, and by Degrees to crawl home to his own House. When I had examin'd the Wound, and considering the great Flux of Blood, I was much surpriz'd that the Patient was alive. *Lipothymies* came frequently upon him, especially upon every little Motion of his Body: These were after some time succeeded by *Convulsions*. The Parts of the *Trachea* were at a vast Distance from each other, the lower Part being every turn of Inspiration sunk deep into the Neck, as low as the *Claviculae*, and just appear'd upon every Expiration.

There seem'd to be no manner of Hopes of his Recovery: However in order to attempt it, I directed a lusty strong Fellow to hold the Leggs of the Patient over his Shoulders, and by this means raise them, together with the *Abdomen*, above the *Thorax*, *Collum*, &c. in which Posture the divided Parts came so near to each other, that with strong waxed Thread I sew'd together several of them: but as to the Divisions of the *Trachea*, I secur'd them together by passing large Needles deep into the Flesh on each side; and Twisting strong waxed Thread about them as in *Labio Fisso*. Over all, for greater security, I apply'd a Restrictive (*ex Pulv. restring. Clowes*) covering the greatest Part of the Neck with a Defensative *ex Bolo cum Albumine Ovor.* advising the Patient to lie as Quiet as he could. The Patient now begins again to speak, and as well as the Cough, difficulty of Breath, and his Weakness would allow, softly and with a low Voice gives an Account of the Occasion as above.

An *Arteriac* was then made up for him (to smoothe the *Trachea*, and promote Expectoration) è *Troch. Pectoral. Batean.* (*in Aq. Stephan. 3 ß Solut.*)

ʒiii. Syr. Tussilag. ʒiss. Balsamic. ʒi Pulv. Anis. Glycer. ana ʒi. Balsam. Sulphur. Terebinth. ʒss. Peruv. Gut. vi. cum Mellis opt. despumat. q. s. fiat Linctus per Bacillum Glycer. sepius adhibend. From the Use of which his Cough abated, and he discharg'd by Expectoration much Grumous Blood and other Matter. As to the Convulsions and Liporhymes, I apply'd to his Nostrils Spir. C. C. Succin. &c. and Embrocated the back Part of his Neck with a Liniment ex Ol. Lil. Alb. ʒi. Tereb. Succin. ana ʒi. N. M. ʒss. Ung. Nervin. ʒvi. Mis.

The next Day I found the Convulsions had left him; nor had he from that Time any return of them, or of the Syncope. But on the 4th Day the Stitches were torn open, the Wound appear'd large enough to admit a middle siz'd Hand: A great Part of the Oesophagus appear'd in View much inflam'd and scratch'd by the Instrument. The Epiglottis did not as usual, cover the Rima of the Larynx, so that I could easily see up into the Mouth, Part of the Annular Cartilage was cut obliquely, and hung only by a little Fibre to the upper Part of the Larynx, &c. Indeed I met with frequent Ruptures the waxed Thread and Needles often fretting through the Flesh they held; but I as often repeated the Stitches in the same Manner and Method as before. About the 10th Day, the largest Blood Vessels appear'd conglutinated and cover'd with new Flesh; the Gula of good Aspect, the Inflammation of that and all the Neighbouring Parts gone. I now dress'd with Liniment. Arcei. On the 11th Day, the Symptomatick Fever was in a manner gone, and the Wound under the Circumstances of good Digestion. In the mean Time the Diet, when he could swallow, was of Mutton-Broth, Ale-Meat, Poach'd-Eggs. The Cough continuing a long Time very severe, was at length overcome by duly adhering to the Linctus aforesaid, with repeated Boles of Balsam. Lacatel. Conf. Rosar. Rosar. Rub. Horâ Somni, with a Draught of a Pectoral Decoction, used also instead of common Drink. To mitigate the Violence of it, and procure him sleep, the following Haustus was frequently used, and never fail'd our Expectation. R. Ol. Amygdal. Dul. rec. Express. ʒss. Syr. de Mecon. ʒvi. Laud. Lond. (Aq. Steph. ʒii. Solut.) gr. ij. fiat Haustus Horâ Somni Sumendus.

About the 11th and 12th Days, we plainly discover'd little Portions of new Flesh arising, not only from the Carneous Membrane incumbent on the Gullet, but also out of the Substance of the Cartilages themselves, both on the upper and lower Parts of the divided Trachea. The external containing Parts of the Neck began now to unite by Incarnation; new Flesh arising, and apparently lessening the Dimensions of the Wound, every Time there was a Laceration of the Stitches, insomuch that two Needles were now sufficient, whereas I used in the beginning not less than six. And those Carneous Portions, both of the Trachea and exterior Parts, gradually joyning and intermixing, became one solid Cicatrix, from each end of the Wound almost to the middle of the Wind-pipe, where the Air continu'd in some Degree to have an Exit. About the 15th Day I remov'd several Pieces of Bones which had contracted a Caries in the Cartilage (which in this Old Man, as in many others, was grown

grown *Offeous*) and were thrust out by the new Flesh. He now swallows with little Trouble, eats sufficiently, and nourishes in Proportion. The Aperture about the 26th Day was almost clos'd up, and in 4 or 5 Days more the sides of the the Wound were perfectly joyn'd and *Cicatriz'd*, the *Trachea* performing its Part in Respiration, as at other Times, without any considerable Inconvenience. He speaks indifferent well, but is forc'd to take care in swallowing, the *Rimula* not being exactly shut as before the Wound, which makes Liquor of any sort more apt to fall into the *Canal*, and so cause a Cough, Hoarseness, &c. He does not swallow dry Meats as well as formerly, but in all other Respects is as well as ever.

The Structure of
the Lungs; by Mr.
J. Tempier. N.
86. p. 5031.

III. Having blown into the *Aspera Arteria* of Fowls, I observ'd the Continuation of many Vesicles, extended from the *Bronchia* through the *Abdomen* to the *Anus*, (which I conceive to be the Cause of the constant Motion of the *Anus* in Fowls; the Air having Ingress and Egress there:) I thence conjectur'd the Substance of the *Lungs* to be a Complication of a Multitude of Vesicles with the Sanguineous Vessels. And in this Opinion I thought myself confirm'd, by blowing into the *Aspera Arteria* of Quadrupeds, when I had cut off Part of the exterior Membrane of one *Lobe* of the *Lungs*, and found the *Lungs* to rise with unequal Protuberances, not unlike Bladders. But the following Experiment hath much shaken that Conjecture.

Mar. 2. 167 $\frac{1}{2}$. I made a Ligature about a Dog's Neck, and opening both the Jugular Veins with a pretty large Orifice, I let him bleed to Death, to prevent being overcharg'd with Coagulated Blood. Immediately I open'd the *Thorax*, and tying the *Vena Cava*, with all the Passages from the left Ventricle of the Heart, or its *Auricula*, I cut the *Lungs* with the Heart and *Aspera Arteria* entirely out. To the *Aspera Arteria* I fitted a Syphon, and fasten'd it with a strong binding of Pack-thread. This done, I blew up the *Lungs*, and fitting a Cork to the end of the Syphon, I hung them in a Chimney to dry. In a quarter of an Hour they subsided about a sixth Part; whereupon I order'd a Person to watch them, and to blow them up as oft as they subsided. Which Course continu'd, they would not the next Morning subside a 4th Part in three Hours. And (excepting 3 quarters of an Inch distance from the Circumference of the *Lobes*, where the Thinness of the Substance of the *Lungs* gave the external Heat the advantage of a sudden Passage, and quick dispatch of drying those Parts least furnish'd with Moisture,) I did not perceive, making a proportionable Allowance for the drying of the whole Substance of the *Lungs*, any considerable subsiding in two Days more. But upon the blowing in at the Syphon (whose Ligature I was now forc'd to renew,) I could easily feel the Air to pass through the external Membranes, both on the Convex and Concave Sides, towards the Extremity of the Circumference of the *Lobes*; but most abundantly on the Concave Side.

Mar. 5. I carefully cut off one of the *Lobes*, and the inward Structure seem'd like a Cane or dry'd Flag when transversly cut; and upon blowing in at the Syphon, I fancy'd the Air to come equally out at all the Pores I had expos'd

expos'd to View. Whereupon I fix'd Spittle in several Places, and upon fresh blowing found Multitudes of Bubbles, made in the denudated Parts of the *Lobe*. Immediately I made a deep transverse Incision into that *Lobe*, and blowing in at the *Syphon*, I found the Air to come so freely out at the larger Ramifications of the *Bronchiæ*, that I could not give the *Lobe* a considerable Rise with a strong Blast: Yet with stopping with my Fingers the larger Passages of the *Bronchiæ*, which I had cut, I found that *Lobe* upon a fresh Blast, considerably to arise with unequal Protuberances (where the Incision was made) giving no small Suspicion of some latent Vesicles. Hereupon I ty'd that *Lobe* above the Incision, and taking off Part of the external Membrane of another *Lobe*, (having first ty'd up all the rest of the *Lobes*,) I pour'd Water into the *Syphon*, and apply'd a strong Blast, in Hopes to have the Water come forth in Streams at all the Pores, but that did not satisfactorily succeed, it coming out in a confus'd Irroration of the external Surface, without any Ebullition, unless at the larger Ramification of the *Bronchiæ*. Then I ty'd up this second *Lobe*, and untied a third, pouring in an Ounce of the Oil of Turpentine; at the *Syphon* I gave a small Blast, and Cork'd it up. Two Hours after I took off the small Membrane of that *Lobe*, and upon a gentle Blast at the *Syphon* found an Ebullition of infinite little Bubbles.

Mar. 10. (having continu'd it to the Chimney,) I cut all their *Lobes* in Pieces by different and various irregular Incisions; whence I could easily observe the several Ramifications of the Aerial and Sanguineous Vessels, with their Continuation to the Circumference of the *Lobes*, and a proportionable Diminution as they were at a further Distance from their Original.

Shall I hence conclude the Structure of the *Lungs* to be a Complication of a Multitude of the Ramifications of the *Bronchiæ* and Sanguineous Vessels? And that the seeming Vesicles were occasion'd only by the Violence of the Blast, and the Dryness of the extreme and smallest Passages of the Aerial Vessels; whereupon, those nearest to the *Bronchiæ* (being moister) were, more than their ordinary Proportion, extended, upon Hindrance of a free and usual Passage to the Air in the lesser Vessels or their Extremities?

IV. Pierce the Side of a Dog between the 6th and 7th Rib in the middle of the *Thorax*, just over against the Region of the *Heart*, with a small Incision Knife, passing the Knife but just into the Cavity of the Breast (which you may justly know by finding no Resistance to the Point of it;) take it out, and put in a Director, or a small Quill made like it, and thrust it in about an Inch, directing the End of it toward the *Sternum*, close to the inside of the Breast. Then cut upon it about an Inch on the *Intercostal* Muscles; by which you may be secur'd from touching the *Lungs* with the Point or Edge of your Knife. This done, put in your Finger, and with your Nail separate the *Nerve* which passeth along the Side of the *Pericardium* toward the *Diaphragme*. Then put in a Probe, a little inverted at the End like a Hook, and apprehend the *Nerve*, and pull it to the Orifice of

An Experiment
concerning the
manner of Respi-
ration; by Lr.
Rich. Lower.
n. 29. p. 544.

the Breast, and cut it off, and sow the Hole up very close. Do the same on the other Side, and presently let the Dog loose, and you will plainly see him draw his Breath like a Wind-broken Horse.

The most obvious Observations from this Experiment, are, 1. That the whole manner of Respiration is quite alter'd. For as in a sound Animal, in Inspiration the Belly swells by the lifting up of the Bowels by the Contraction of the *Diaphragme*; and in Expiration the Belly falls by the Relaxing of the same: In a Wind-broken Dog, or Horse, 'tis quite contrary; for in them it is to be seen plainly, that when they draw their Breath their Belly is drawn in very lank and small, and when they Breath out, their Belly is relax'd and swells again. 2. The Lungs not moving of themselves at all, but all Inspiration being made by the Dilatation of the *Thorax*, and that Dilatation being caus'd partly by the *Intercostal* Muscles drawing up the Ribs, and partly at the same time the *Diaphragme* by its Contraction drawing downward the lower smaller Ribs to which 'tis joyn'd, and also lifting up the *Viscera* of the lower Belly, by which they do jointly make all the Space they can for the Air to come in and distend the *Lungs*, it must hence necessarily follow, that where one ceaseth from its Work, the other for the Exigence of Nature must take more Pains to supply the others Defect. So that the *Diaphragme* being made useles by loosing its *Nerves*, the *Intercostal* Muscles dilate the Ribs much more than formerly, even to the utmost Distance they can, when there is need for it; as when you make the Dog run a little after he is cut, or when you gallop a Wind-broken Horse, doth manifestly appear. 3. The manner of Respiration being the same in a Dog, whose *Diaphragme Nerves* are cut, and in a Wind-broken Horse, 'tis more than probable, that the Cause may be as nearly the same, as the Signs are, and that (for the most part if not always) they have their Occasion from the Relaxation or Rupture of the *Nerves* of the *Diaphragme* at first.

A Supply of
fresh Air neces-
sary to Life; by
Dr. R. Hook. n.
28. P. 539.

V. I formerly try'd an Experiment of keeping a Dog alive, after his *Thorax* was all display'd by the cutting away of the Ribs and *Diaphragme*; and after the *Pericardium* of the *Heart* also was taken off. But divers Persons seeming to doubt of the Certainty of the Experiment, I caus'd it to be repeated at a Meeting of the *Royal Society* with the same Success; the Dog being kept alive by the reciprocal Blowing up of his Lungs with Bellows, and then suffer'd to subside, for the Space of an Hour or more, after his *Thorax* had been so display'd, and his *Asperia Arteria* cut off just below the *Epiglottis* and bound on upon the Nose of the Bellows.

The Dog having been thus kept alive above an Hour, (in which time the Trial was often repeated in suffering the Dog to fall into Convulsive Motions by ceasing to blow the Bellows, and permitting the *Lungs* to subside and lie still, and of suddenly reviving him again by renewing the Blast, and consequently the Motion of the *Lungs*) I caus'd another Pair of Bellows to be immediately joyn'd to the first, by a Contrivance I had prepar'd, and pricking all the outer Coat of the *Lungs* with the slender Point of a very sharp Pen-knife, this second Pair of Bellows was mov'd

mov'd very quick, whereby the first Pair was always kept very full, and always blowing into the *Lungs*; by which Means the *Lungs* were always kept very full, and without any Motion, there being a continual Blast of Air forc'd into the *Lungs* by the first Pair of Bellows, supplying it as fast, as it could find its Way thro' the Coat of the *Lungs* by the small Holes prick'd in it, as was said before. This being continu'd for a pretty while, the Dog, as I expected, lay still, as before, his Eyes being all the Time very quick, and his Heart beating very regularly: But upon ceasing this Blast, and suffering the *Lungs* to fall and lie still, the Dog would immediately fall into dying Convulsive Fits; but be as soon reviv'd again by the renewing the Fulness of his *Lungs* with the constant Blast of fresh Air. Towards the latter End of this Experiment a Piece of the *Lungs* was quite cut off; where it was observable, that the Blood did freely circulate and pass thro' the *Lungs*, not only when the *Lungs* were kept thus constantly extended, but also when they suffer'd to subside and lie still. Which seem to be Arguments, that as the bare Motion of the *Lungs*, without fresh Air contributes nothing to the Life of the Animal, he being found to survive as well when they were not mov'd, as when they were; so it was not the more subsiding or movelesness of the *Lungs* that was the immediate Cause of the Death, or the Stopping of the Circulation of the Blood through the *Lungs*, but the Want of a sufficient Supply of fresh Air.

VI. Dr. *Thruston* asserts the chief Use of *Respiration* to consist in maintaining a Motion of the Blood: But the Arguments he produces to make out his Assertion seeming to me Insufficient, I pitch'd upon the following Experiment, which I hope will be decisive of that Matter.

The chief use
of *Respiration*;
by Dr. Will. Mus-
grave. n. 240. p.
178.

I took a large, middle-aged, healthy Dog; and, having freed the *Trachea* from the adjacent Parts, cut it off just beneath the *Pomum Adami*, and turn'd the loose End outward. After some Time allow'd him to recover the present Concern; with a Cork, got ready on Purpose, I stopp'd up the *Trachea*, binding it close to the Stopple. Some few violent Struggles succeeded; in which the *Sternum* was rais'd, as in the deepest Inspiration; and thus he dy'd. From the Stoppage of his Breath, to the last Motion I could perceive in any Part of his Body, was, from a Watch, observ'd to be the Space of two Minutes. I then immediately threw open the *Thorax*; where I saw the Blood stagnating in the *Lungs*; the *Arteria Pulmonaris*, the right *Ventricle* of the *Heart*, with its append-
ing *Auricle*, and the two great Trunks of the *Cava*, distended with Blood, to a Degree excessive: The *Vena Pulmonaris*, left the *Auricle* and *Ventri-
cle* of the *Heart*, in a manner empty; not containing (as near as I can
guess) more than one Spoonful of Blood.

This Experiment proves, That *Respiration* promotes the Passage of the Blood thro' the *Lungs*; and in Bodies full of vigorous Blood, it is, on this Account, of perpetual Necessity. This Acceleration of the Blood in that Passage, seems to be the principal Use of *Respiration*; no other is of such Consequence to Life, or stands in Competition with it.

A Polypus of
the Lungs; by
Dr. Rob. Clark.
N. 235, p. 779.

Fig. 8.

VII. A poor Man (a Taylor by Trade) has been ill by Times this 4 Years, but for 3 Years last pass'd has frequently Cough'd up something of the Similitude express'd in the *Figure*. He Coughs them up after a continu'd Coughing of almost half a Day or Night, and knows when they come, at the feeling Pains round his Chest; he has voided Hundreds of them, and all alike, tho' some are a great deal bigger, and many less than the Description. They don't seem, he saith, to have Life; but he has press'd a Sliminess out of the Body, and so through that Part which seems to be the Head. This had a great many more Fibrils towards the latter end than I express'd, and seem'd to be very Nervous. He is now very Meager, and complains of great Pains about his Chest and Back-part answerable to it.

By Dr. Lyfter.
Zb. p. 780.

2. These are Figur'd in the remoter and deeper Branches of the *Aspera Arteria*: And therefore so difficult to get up. They are nothing else but the viscous Excretions of the small Glands, hard bak'd in those Molds, whose Form they receive; and may, if we strain a Metaphor, be call'd *Polypus's* of the *Lungs*.

A Polypus of
the Lungs; by
M. Buffiere. N.
363 p. 543.

Fig. 9.

3. A Boy of 5 Years old dy'd at *Kensington* of a *Consumption*. A Year before he dy'd he was troubled with a dry Cough, which continu'd ever since, Spitting now and then a little Quantity of Blood; 10 or 12 Days before he dy'd, his Nurse took Notice of some thick Skin, as she said, he spit out. His Physician having examin'd one of them, found it had the Consistence and Shape of a Vessel, which made him think it might perhaps be some Vessel of the *Lungs*. The Child being dead, I open'd the Body, and found the *Omentum* quite destitute of Fat; so were likewise all the Parts of the Body; the Glandules of the *Mesenterium* were harden'd and blackish. In the Left Side of the *Lungs* I found a little Purulent Sanies: The inside of the *Trachea Arteria* was incrustated with a slimy Membrane, which I took off from the *Trachea* and the Branches in the *Lungs*, in so much that that *Pellicula* made a perfect Vessel from the *Larynx* to the very Extremities of the *Bronchies*, of which it came off very easily without breaking either the Trunk or the Branches, just as you see in the *Figure*. It adher'd to the inward Coat of the *Trachea* only by some small Filaments, which were so tender that they broke off easily, which made me think the Production of that extraordinary Vessel was nothing but the Mucilaginous Humour, which is continually discharg'd by the Glandules of the *Trachea*, which being grown more clammy by the Distemper, was reduc'd to a kind of Jelly by the Dryness of the Air, which Dryness not permitting the Spitting it out, incrustated the inside of the *Trachea* and *Bronchies*, and growing thicker was at last shaven off by the violent Fit of Coughing the Child was sometimes taken with, and then was renew'd again by the succeeding *Mucus*. This new Vessel would not dissolve in hot Water: The Vessels of the *Lungs*, that is, the *Trachea* and *Bronchies*, the *Pulmonary Arteries* and *Veins* were as whole as could be.

This

This I hope will undeceive those, who believe that Men sometimes spit out the *Blood-Vessels* of their *Lungs*.

VIII. I cut out the Hearts of two *Urchins*, and found the *Systole* and *Diastole* to continue full two Hours, while the Hearts lay upon a glased Earthen white Plate in a cold Window. The Distance of their *Diastoles* was unequal in Time, but very large for half an Hour, and then sensibly diminishing untill they ceased at the two Hours Distance; and would not then be reinforced by a Needle's Point, which for the half Hour preceeding they would answer at any Time. After they had ceased above $\frac{1}{4}$ of an Hour, so as a Needle pricking them caused no Motion; yet upon setting the Plate upon the Hearth in the Chimney, in about two *Minutes* of Time they began to beat, though but weakly; and upon 8 *Minutes* continuance they beat freely; and when removed into the Window again continued their Pulsation, without Pricking, above an Hour, and might have done longer, could I have spared my Servant to attend them longer. Paradvantage we may hence Conjecture at the Cause of *Life* and *Death*. But when shall we say any Animal or Insect is *Dead*, if it hath Motion?

The Motion of the Heart; by M. Templer. n. 93. p. 616.

IX. 1. We lately met with a Body, which being opened, the Liquor which is contained in the *Pericardium*, or the Bag of the Heart, was found congealed into a Consistence fit to be cut with a Knife, and 2 square Fingers thick about the Heart.

A strange Pericardium; by M. de Mort. l. n. 58. p. 1184.

2. In *Octob.* 1684. A preternatural Lump of *Flesh* was taken out of an Ox at *Oxford*. The Weight of the whole Substance, cleared from the little Fat, &c. adjoining to it, amounted to $19\frac{1}{2}$ l. It very much resembled a *Heart*; but it was something flatter, and each of the flat sides made an Equilateral Triangle. The *Basis* of this Cone of *Flesh* was 2 Ft. 7 Inches in Circumference, and a Thread drawn round it length-ways from the *Basis* to the *Vertex*, came to 2 Ft. 9. In.

A Glandulose Substance found between the Heart and Pericardium of an Ox; by n. 67. p. 260.

When we had divided it, cutting from the *Vertex* to the *Basis* of the Cone, and passing through both the *Ventricles* and *Mucro* of the Heart, we found the Heart not to exceed the Natural Size: that which was extraordinary about it, being a large *Glandulose Substance* compassing the Heart (unless where the Vessels had their Passage,) and stretching the *Pericardium* to the excess before mention'd. We saw no Liquor in the *Pericardium*, nor indeed was there room for any; this *Glandulose Substance* taking up all the space between the Heart and *Pericardium*, to both which it grew very fast. It was thickest about the *Basis* of the Heart, where it covered the *Auriculae*, and was $3\frac{1}{4}$ Inches thick; It grew thinner on both sides gradually toward the *Mucro*, where it was $1\frac{1}{2}$ Inch thick. In the *Septum Cordis* a gritty *Sabulose Substance* was found, half as big again as a Walnut. In the *Lungs* were several *Cystides*, containing Matter more or less Fluid: One very large *Cystis* held some Ounces of a Matter not unlike that of a *Steatoma*.

The Butcher who killed this Ox says, the *Lungs* grew fast to the *Pleura*.

Pleura on both sides; which he affirms not to have found once in 40 times in the Cattle kill'd by him. He says also, that the Ox, tho' not overburthened with Fat, complained much in Travelling; which is easy to account for, there being not Room for the *Heart* to be distended, as it ought, in its *Diastole*.

A Polypus in the
Heart; by Mr. W.
Gould, n. 157 p.
537.

X. A Poor Labouring Man dyed suddenly at Oxford in the Street. The Vulgar, which alone convers'd with him in his Illness, give this Account of him: That he was of a Swarthy Lurid Complexion; He was afflicted with fits of the Falling-sickness; An Obstinate Quartan Ague of above a Year's continuance; A deep Jaundies, even to that Degree, which is call'd the Black, with its constant Consequent an universal settled Ill Habit of Body; A Sense of a hard Load and Pressure at his Stomach (meaning perhaps his Breast, or the upper Part of the Region of the Liver;) He complained much of a very great shortness of Breath, being almost constantly apprehensive of Choaking; far fetcht involuntary Sighings, and prodigious Palpitations of his Heart continually afflicted him; He used to Swoon very often; and at length died, according to the Judgment of the By-standers, in the shivering Fit of his Ague, with the Convulsions of an *Epilepsy*, not without Foaming and Frothing at his Mouth.

When we open'd him, the *Liver* upon deep Incisions appear'd Bloodless, stuff throughout like a bag of Sand with a yellow gritty Substance: The *Gall-Bladder* also was furnish'd with the like, but of a darker hue; The *Spleen* was very large and of too soft and loose a Texture, not much discolour'd; The *Omentum* rotten and wasted; The *Membrane* of the *Stomach* extremely flaccid and very thin, appearing black and mortified, and upon taking it out within 24 Hours after Death (tho' ty'd at both Ends very close) sent forth such an intollerable soure rancid Scent, that the strongest double *Aqua fortis* (to which it might be best compared) could not prove so troublesome and offensive to the smell; The *Lungs* were distended to the uttermost with a Purulent Froth; The *Heart* much stretched beyond its natural Magnitude, and of a very flat Figure; the *Veins* of the whole Body, were of an unusual and extraordinary Bigness, especially the Internal *Jugulars* were strain'd to above $\frac{1}{2}$ Inch Diameter; *Polypos Concretions* also were found in the larger *Veins* of the Arms, Legs, and other Parts, but that was most remarkable which we found in the Right *Ventricle* of the *Heart*, and towards its Apex or Tip firmly Radicated, so that no small stress was required for the Separation. The Part A, by which it was fix'd, was nigh an Inch and half Diameter when fresh taken out, irregularly rough at the Bottom, insinuating many Roots into the *Lacuna* or little Cavities of the *Ventricle*, which again by lesser Fibres were fastened to the inner Membrane of the *Heart*. The great Branch B, which ran out into the Right *Auricle* was nigh two Inches Diameter at the largest Extreme, and reach'd no farther than the Insertion of the *Vena Cava*. As for those Branches mark'd G G, tending to the Arms, how far they grew I cannot assert, not knowing whether they were broke off or no, but the Branches H H H H, &c. tending

ing towards the Head (I well remember) could not be drawn out without some Force, and 'tis very likely they were broke off at the *Diverticula*, or two round *Sinus*'s where the *Jugulars* enter the *Scull*; for the like Concretions were found in the Vessels of the *Brain* to which probably these might be adjoyned. The Substance of the whole was plainly Fibrous resembling a Nerve, and Tough while Moist (though upon Drying, Brittle,) the Colour White, and was cloathed with a thin Coat, including (in that Part which fill'd the Right *Jugular Vein*,) two little Black Specks *b b*, of Blood (as we suppose) a long while there Coagulated.

It is a Question much debated by Physicians, Whether a *Polypus* is produced some considerable time before, or always immediately after Death? *The Cause and Nature of a Polypus.*

Those that contend for their sudden Generation after Death, among other Reasons of less Moment, insist much on the Argument drawn from the tough Skin spreading it self in a short time on Blood let out for the Cure of *Pleurisies*, *Peripneumonies*, *Rheumatisms*, violent *Head-aches*, and in Cases of any inward Inflammations; and it seems a good Consequence, that the same coldness and want of Motion after Death as easily make the same Product in the Vessels, and 'tis to be confest that such like Concretions have been discover'd in *Pleuritical* Bodies Dissected. But on the other side it may be urg'd, that this Appearance is not constant in all Dissections of Bodies so Affected, and that very frequently nothing like it has occur'd; from whence we have Reason to Conjecture, the outward Contact of the Air pressing the surface of the emitted Blood, or some other external Cause, may have an Interest in forming that Skin; for else why should not the like Concretion proceed constantly in the Blood-Vessels, whence Air is excluded, as well as when the Blood is exposed in a Porringer. Besides we find that these *Pituitous* Bodies scarce ever offer themselves in Dissection of *Pleuritical* Persons, but where the *Pleurisy* was complicated with some other long settled Indisposition; so that the time of their Growth cannot be certainly collected from such Instances; besides, when they do chance to appear in a single *Pleurisie*, they float loose in the Mass of Blood without fixing to any Part, are of a very Lax Texture, without any distinguishable Fibres, and like what covers *Pleuritical* Blood in a Porringer, do rather resemble a stiffer sort of Jelly or Size almost dry'd, than any thing of a tough and Fibrous consistence, such as is observed in a *Polypus*.

Kerkringius Asserts it in his own Power to make such Concretions at Pleasure, by the known Experiment of *Injecting* Spirit of Vitriol into a Dog's *Veins*, and observing the quick Coagulation so made, infers that some peccant Acid in the Blood, occasion'd by a Disease, may as suddenly produce the same when Life is gone. To this it may be answer'd, that this *Artificial Polypus* is only a kind of Grumous and strongly Concreted Blood, wholly different as to Colour, Texture, and Firmness, from that Substance we here discourse of. But however, if *Kerkringius* was so lucky as to produce one exactly like a true *Polypus* in all Circumstances, tho' it gives indeed some light into the Nature of their Cause, yet it does not follow that this Cause must

must always work its Effect in an Instant, but a longer or shorter Time will be required as the Cause is more or less Active. In the mean Time I do not deny, that strange Coagulations have suddenly happen'd, and Anatomy has often made such Discoveries in Cases of sudden Death; yet even these Generally are not to be lookt on as Products after Death, but rather the quick inevitable Messengers and immediate Fore-runners of it; such are those Concretions, that upon Dissection have been found in the *Heart* and Blood-Vessels of Persons kill'd by sudden *Frights*, as also in those that have been quickly dispatch'd by an unexpected Fit of an *Apoplexy*, a *Cardiacal Syncope*, or a suffocating *Catarrh*; where the Coagulative Spirit, like Lightning, strikes through the whole Mass of Blood, and either fixes it and makes it unapt for the generation of fresh Spirits, or else, if a gross Similitude may illustrate so Abstruse a Matter, (like what happens to the invisible Steams of Spirit of *Salt Armoniac*, which will be condens'd grow turbid and visible, at the Approach of the Vapour of Spirit of *Salt* or *Nitre*) the Animal Spirits themselves are clouded, altered from their Natures extinguish'd and quite destroy'd, by a mixture of the Foreign Præternatural *Halitus*. 'Tis not improvable, that by one or both of these Methods the Pestilential Effluvia of an Infected Air, the *Arsenical* Exhalation of a Damp, and the *Nitro-Sulphureous* Steam (much like the Scent of Spirit of *Nitre*) arising from burning Char-Coal, do often act such sudden and fatal Tragedies. For if we reflect on the Membranous Substance of the *Lungs*, the infinite Number of Vesicles they are compos'd of, how that in every assignable Point the Vesicles are adorn'd with Capillary Blood-Vessels, so that the point of a Needle every where draws Blood; if we calculate the inward Concave Superficies of the *Lungs*, supposed unfolded and spread out into a plain, which must needs exceed the outward apparent Convex above an Hundred times, and consequently consider the vast surface of Blood each Moment exposed to the Air: Lastly, if we allow the Ingress of the Air into the Blood upon Breathing, which scarce any now deny; I say, if we reflect on these Things, 'tis easy to imagine how suddenly mischievous any Coagulative Poysonous Steam may prove, since together with the Air 'twill be diffus'd through all the Blood contain'd in the *Lungs* at the very instant of Inspiration, and (whether it be Austere, or Acid, or both, or what other Name Physicians may please to give it) joyns it self *per minima* with almost each Particle of Blood, and presently destroys all Fluidity, stuffs the *Lungs* and *Heart* with an immoveable, and almost mortify'd, Mass; puts a final stop to the Circulation, and so in a Moment breaks off the Series and Thread of Life. The Concretions that have such surprising Events we must allow to be suddenly produced, and we may ascribe all perhaps to the exceeding briskness and activity of the Acid, or what other Quality gave their Origine; but nevertheless in the Case of Lingring Diseases, I think it will be no hard matter to prove (not to contend that they differ from those already mention'd) that at least they make a slower progress in their growth, as proceeding from a less Active Cause, and considering the Nature and Consistence of the Bodies themselves, the Diseases and Sym-

toms that usually accompany them, and the Circumstances of those Dissections that have discover'd them, they must needs appear a Work of Time, and by a Daily Apposition of new Parts, swell into that strong Bulk and Shape they sometimes obtain.

What Consistence these Bodies sometimes acquire, this above describ'd is a very instructive Instance. The close Fibrous Texture, the tough Membrane that cover'd it, and the two black hard Specks therein included, its strong Adhesion to the *Heart* by little Capillary Roots, and other larger Protuberances adapted to all the little Cavities of the *Ventricle*, are Arguments that it was no small Time in growing: And if it happen'd after Death, how came it to pass that the large Branch *B*, should stop within the *Auricle*, and that nothing of the like Substance should be continu'd farther into the *Vena Cava*, since the Blood there must needs be as much dispos'd to such a sudden Coagulation as in the *Heart*? Lastly, If to these Remarks, we add the Instance *Malpighius* gives of a *Polypus* made hollow by the Current of the Blood, like another new Blood Vessel fram'd within the Natural one; if also we add another round one *Borellus* speaks of, bigger than a Man's Fist, found in the *Aorta* of the *Heart*, consisting of a great many Membranes lying unconnex'd one upon another, like the Leaves of a Cabbage, (a Product, without doubt, of no small Time) we need go no further than the bare Accidents of these odd Bodies themselves to prove their long Continuance before Death. And the present Subject so demonstrates the Thing, as to leave no place for Doubt: For here we have the *Jugular Veins*, (whose Coat could not have been much stretch'd on a sudden, even by the Wind of a Smith's Bellows,) in tract of Time, enlarg'd only by the gentle assiduous Pressings of the Blood to thrice their former Diameter, that is, nine times their Natural Cavity. Here we have a *Heart* (the strongest and firmest Muscle of the Body) by degrees form'd into a Shape quite different from the Natural; the Right *Auricle* and *Ventricle*, notwithstanding the Strength of the Fibres of the latter, and their Indispos'dness to stretch easily, so prodigiously distended, that no outward Force whatever, without breaking it could effect the like: Such hard Shift did Nature make to continue the vital Stream, and avoid the fatal Stop, each Moment threaten'd by the *Polypus*, that with double Force she was oblig'd to maintain a Pulse; (which because it could not break or expel the unnatural Load, did by little and little stretch the Sides of the *Ventricle*, for the more easy Passage of the Blood, and by terrible Palpitations for a long time protract a miserable Life, till the monstrous Body growing too big, the weaken'd Fibres could stretch no more, nor yet regularly contract themselves any longer; so that the *Heart* at last, just ready to sink under the Burden is forc'd to collect its little remaining Strength into one brisk Effort, and assisted by all the Spirits of the Body caus'd the poor Wretch to expire in an Universal Convulsion.

The Diseases wherein almost always *Polypi* may be expected, are the *Apoplexy*, *Frenzy*, *Falling-Sickness*, *Convulsions*, *Asthma* (or difficult Breathing) *Consumption*, ill cured *Pleurisies*, ill cured and lingering *Fevers*, *Plague*, *Veneral Diseases*, *Pleurisies*, *Peripneumonies*, *Green Sickness*, *Varices* of the

Veins, and inveterate *Head-aches*, &c. The Part most usually affected is the Right *Ventricle* of the *Heart*, and the *Genus Venosum*, where the Blood returning from the *Habit* of the *Body*, slow in Motion, impoverish'd and dispirited, more easily admits such a Concretion: Yet the Left *Ventricle*, and the *Genus Arteriosum*, frequently breed the like; such was that *Tulpius* mentions branching out into the *Aorta* and *Vena Pulmonaris*, in a Person who dy'd of a grievous *Apoplexy*; and such *Wepfer* makes one great Cause of *Apoplexies*. The *Sinusses* of the *Brain* also often harbour them, as we have found in One that had an obstinate *Head-ach*, and at last dy'd *Mad*; and not long since in another, who once had some Fits of a *Frenzy*, and at length dy'd *Epileptical*; in both which Cases the *Sinus Longitudinales* was full of *Polypus*, which emitted very tough Branches into all the little lateral Vessels: And *Blasius* gives the like Account in a *Mad-Man's Brain*, who at last dy'd *Convuls'd*. Upon the Stress of these, and many other Observations of this Nature, 'tis reasonable to Assert, that a *Polypus* is so far from being a Product at the Period of the Disease, that it seems rather a stated settled Cause, as well as an immediate Occasion of the fatal Symptoms which attend the most incurable Distempers; thus if in the *Heart* it grows so large as to force a *Diastole* beyond the due Tension of the Fibres, it produces a Mortal *Syncope*; if smaller, and not exceeding the Confines of the *Ventricles*, a strong and irregular Pulse succeeds, and there must be a *Palpitation* of the *Heart* to maintain Life; if it sends Branches into the larger *Pulmonary* Vessels, the Motion of the Blood is retarded, and the *Breast* and *Lungs* labour under their Load in an *Asthma*: Or if it reaches the *Capillaries*, a *Peripneumony*, an *Ulcer*, and at last a *Consumption* is at hand; if the Concretion begins in the small Vessels of the *Pleura*, then a *Pleurisy* follows; if it grows and fixes in the larger Vessels of the *Arms*, *Legs*, or the like, painful *Varices* appear; and probably *Rheumatisms* owe much of their Pain to some such Concretions begun in the *Capillary* Vessels of the *Habit* of the *Body*. Again, when these Bodies are in the *Sinus* of the *Brain*, if small, the Vessels will only be a little distended, and so a Pain in the *Head* may suffice; but if larger, the Obstructions increases, the Blood and Spirits are cast into a Hurry, the *Brain* is inflam'd, the Senses presently are disorder'd in the Apprehension of their Objects, and so a *Frenzy* seizes the Man; if they chance to be yet bigger and fill the *Sinus* more, the Blood pent up moves more furiously, and so destroys Sense and all voluntary Functions; then the Tumult extends beyond the Limits of the *Brain* through the whole System of the Spirits, and whereas in a *Frenzy*, Sense, though mistaken, did direct their Paths, now they run *qua data Porta*, ungovern'd and impetuous thro' the Nerves and Muscles, causing the involuntary Motions and *Convulsions* of an *Epilepsy*, which continue till the Spirits are spent, the Blood quiet, and the Blood-Vessels, by the very Agony enlarg'd equal to their Burden; and indeed in *Epilepsies*, Dissections seldom miss of a *Polypus*; neither can we deny this *Convulsive* Power of a Concretion in the *Brain*, since the great *Lower's* Experiment tells us, That a Dog dy'd in terrible *Convulsions* by injected Milk Coagulated only in his *Heart*: But lastly, If the *Sinus* prove almost totally

totally obstructed, the Blood instantly o'flows the *Brain*, and without much previous notice (except perhaps of Giddiness, loss of Sight, or the like) an *Apoplexy* insues; which Disease will also more dangerously happen, when some Particles of a *Polypus* in the Left *Ventricle* of the *Heart*, broken off by the violent stream of Blood, shall be impacted into the *Carotid Arteries* at their Insertion into the *Brain*, whence all Intercourse of Spirits will irrecoverably be stop'd. Now tho' in some of these Cases a *Polypus* does only by fits disquiet the Man it possesses, yet it is in Being when it does not produce such sensible Effects; for Exercise, Passions, Diet and other External Causes, will so affect the Quantity and Motion of the Blood, that the Obstruction may be more insupportable than when the Stream was calm: And 'tis as easy to imagine the Disorders thus caused in an Animal Body, as that a large swift River, damm'd up from quietly pursuing its own Channel, must needs impetuously overflow all the Country about.

And thus we have consider'd those Symptoms of which a *Polypus* may be rationally thought (at least occasionally) the next and immediate Cause: As for others before-mention'd, namely the *Plague*, *Venerical Diseases*, *Lingring Fevers*, and the like, they are not the Effects of a *Polypus*, but Causes, that dispose the Blood of some Persons to such *Pituitous Concretions*.

But to discover their Cause more nicely, we may observe with *Wepfer*, that Persons thus afflicted are never well, breath hardly, have frequent *Palpitations* of the *Heart*, unequal Pulses, are dull to all Action, Stupid, Luxurious and Slothful, of a Livid, Leaden or Sallow Complexion, or a Saturated Red in Hands and Face, because there is either very little Blood in the Capillaries of their Skin, or at best a slow Circulation; their Blood has usually a Thickness, and peculiar *Lentor* in it, or abundance of *Serum*, the latter for want of Volatile Salt to digest the *Chyle* into a laudable Red, and the former happens, either because the *Heart*, destitute of Spirits for its Pulse, cannot duly agitate the Mass, or (as Experiments on Blood emitted seem to prove) by Reason of the Mixture of a Preternatural Acid, whence may infer this conjunct Cause of a *Polypus*, that the Fibres of the Blood, not being sufficiently sustain'd and kept asunder by a due Motion of the intercepted Fluid Parts, may either barely upon the Account of Rest cling together, or else may be by Degrees connected by an Austere Astringent Acid (always to be found in *Cachectical Bodies*) for the same Reason as (an Analogous Liquor) Milk is curdled, only with this Difference, that in this, the Coagulation is Brittle, because the Fibres are weak and short, whereas it may be very Tough in Blood, because its Fibres are strong and of a greater length.

Upon the whole we may conclude, That whatever maintains the Fluidity, Motion, Spirit, and Texture of the Blood, promises a Cure, though not of a confirm'd *Polypus*, yet of the first Rudiments of it. All these Indications are answer'd by Medicines of Volatile, Brisk, Active Parts, which destroy Acids, exalt and ferment the Blood, and not only hinder but also dissolve the first Beginnings of Coagulation; and probably, it is by affecting

ing the Blood, and not immediately the *Nerves*, that they do such Feats in Diseases before-mention'd. Lastly, The Effects of Bleeding in some Cases can never enough be admir'd: Thus *Riverius* tells us of a Girl, 12 Years Old, being Bleed plentifully for a *Pleurisie*, was Cur'd of her *Falling-Sickness*, a Disease never without the Suspicion of a *Polypus*.

Explication of
the Figure.

Fig. 10.

Figure 10. Represents the *Polypus*, as it appear'd when fresh expanded on a Board. *A*, That Part which was firmly rooted in the Right *Ventricle* of the *Heart*; *B*, The Branch terminated in the Right *Auricle*; *CDD D*, The Part tending toward the *Lungs*; *EE*, The Branch running out of the *Ventricle* into the *Pulmonary Artery*; *eeeeee*, The several lesser Ramifications distributed according to the several Divisions of the *Pulmonary Artery*; *FFF*, The Branch belonging to the descending *Vena Cava*; *GG*, The Branches begun in the *Axillary Veins*; *HHHHH*, The Two Branches that ran up the *Internal Jugulars* even to their Entrance into the *Scull*; *bb*, Two little Black Specks of concreted Blood contain'd within the Coat of the *Polypus*.

A great quantity of Liquor found in the Thorax: by Dr. Natt. Fairfax. n. 29. p. 546.

XI. A Maid of *Rumborough* in *Suffolk*, when she was about 12 Years of Age, took *Chalybeats* for the *Green-sickness*, and found some Relief by it, but was after much pent in her Wind. From 16 to 22, she much afflicted herself with Grief, during which Time she had every Year an Acute Disease or two. At 18, she was very weakly, clogg'd in her Chest, and Melancholy. If she went out in a windy Day, the Wind, she said, was ready to choak her. She was a very slow Walker, going up Hill or up Stairs with much Difficulty. She was now observ'd to be very Thirsty, usually Drinking at Bed-Time, and in the Night too sometimes, else she said she should be choak'd with Drought. Between 21 and 22 of her Age, going down Stairs, she heard a frightful *Folking* in her Breast. She took several Things of *Dr. Brown*, and others at *Norwich*, for about 6 Months Time, without finding Relief. Half a Year after, towards *Michaelmas*, upon taking a slight Cold, she was so stop'd up that she could only whisper; nor could she lye flat, but rear'd up with Pillows. I presently caus'd a *Vein* to be open'd, and within less than an Hour she got Breath, and soon after grew as well as she was before. She affirm'd, she never sweat in her Life, nor could it be procur'd by ordinary *Sudorificks*. Being desirous to add an Empirical Remedy, I gave her 3 of *Matthews's* Pills, which did sweat her lightly, but beyond whatever she remembred. Several daily Doses of *Lockyer's* Pills, 4 per Dose, remov'd the *Folking*, as she said, lower to the *Midriff*: When she, fearing an *Hyper-Catharsis*, laid them by for 2 or 3 Days, and then taking them up again, could find no further Alteration by them. She could never lye on her Left-side. In the 23d Year of her Age, in Winter, she had a dangerous Fever, with a *Diarrhoea*, but came off. In her 24th, in Winter again, she got Cold, was quite stop'd up, after 5 or 6 Days fell into a *Convulsion* ere she was Bled. By Bleeding, tho' too late, she had present ease, and cheer'd up in the Evening, but dy'd the next Morning.

When I had laid open the hollow of the *Thorax*, there steam'd out a very

very offensive Smell, notwithstanding the sharp Frost at that Time. The whole Cavity was empty above, (as the Body lay supine) and beneath, all the Right-side and about $\frac{1}{2}$ of the Left was fill'd with a Liquor, which took up in the part to the Neckward a Hand-breadth, and ran 3 Fingers thickness to the Left of the *Mediastinum*. The Liquor was like Cream, or rather like a Size of *Spanish-White*, having a cast of Yellow like Beestings; for putting a Spoon into it, from the bottom I took up a thick clammy Matter, just like that *Spanish-White* that sinks to the bottom of its Size. In Quantity it might be about 3 Pints, contain'd in a Bag which was capable to hold as much more and better. The Bag ran along the Left Shoulder, to the utmost of the Right-side of the *Midriff*; not streight along, nor stiffly stretcht, but about a Hand breadth from its Rise it went directly down to the *Midriff*, with which it closed all along. Its Skin or Coat was thicker than that of the Stomach, as well as its Capacity larger, inasmuch as the Flexures of the Ribs joyn'd with it, and made up above half the Compass. Where it adhered to the *Midriff*, 'twas near a Finger thick: And in one Place, where I endeavour'd to separate it from the *Midriff*, I hit upon a thinner Bag, whence issued 2 or 3 spoonfuls of sheer Water. The *Mediastinum* was either wholly wasted, or else woven into the thickness of the Bag, as was also the *Pleura*, as far as the Bag reach'd. It lay loose and flapping from the Left *Axillar* to the Chest, having been before fill'd and distended either with Wind or the Liquor. All the Hollow was bedabbled with the Wallowing of the Liquor about, as is the *Ouse* by the Ebbings and Flowings of the Tide in a Channel. That *Lobe* of the *Lungs* which should have been on the Right-side was gone, and that on the Left, wasted to near a third part. In the Lower Belly all was well.

The *Folking* was exactly like that of Water or Milk. This Woman was as flat-breasted as a Man. 'Tis probable, that the Liquor proceeded from the falling down of the *Chyle* from the *Axillars*.

An Hydrops Pectoris; by Mr. Sam. Doudy. n. 224. p. 390.

XII. A Noble Peer, many Years ago was troubled with an extraordinary shortness of Breathing; his Lordship was always better in Bed, or Lying, than Sitting or Standing, quite contrary to other *Asthma's*, in which the Afflicted, in Fits, are not able to lye down, the Muscles of the Breast having a freer Motion when in an Erect Posture. Upon opening the Body, both the Cavities of the Breast were found full of Water, which when Standing or Sitting pressed so upon the *Diaphragm* that Respiration was perform'd with Difficulty, but when Lying, that floating Load was so disposed, that that Office of Nature was better perform'd. This seems to be so Natural a Symptom, that it may be almost an infallible *Diagnosis*, to distinguish an *Hydrops Pectoris* from other more frequent Diseases of the Breast, that give a shortness of Breathing. His Lordship, tho' Ancient, was in all his *Viscera* very Sound.

Perhaps it may not be impracticable to use the *Paracentesis* in the like Case, when the Disease is certainly known, and without it Death is most likely to ensue.

XIII.

Warm Water
injected into the
Thorax of a
Bitch; by Dr.
Willi. Musgrave.
n. 240. p. 181.

XIII. *Jun.* 21. 1683. I Syringed ziv. of warm Water into the Right-side of a Grey-hound Bitch, which caus'd a great Rigour (especially in the Hinder-parts) a shortness of Breath, a burning Heat in the Flesh; she look'd Heavy, was unwilling to rise or stand long on her Feet. Those Symptoms wore off by degrees, so that in a Week's time she appeared as well as ever. *Jul.* 2. I injected z xvi. of warm Water into the Left-side of the *Thorax* of the same Grey-hound, after which she was extremely Hot, and short Breathed; I felt a violent Throbbing of the *Heart*, but the Rigour was not so great as in the first Experiment; she recover'd this also in the space of a Week. *Jul.* 15. I injected ℥iij. of warm Water into one side of the *Thorax*, and ℥ij. into the other side of the same Bitch; the Symptoms attending it were (as in the former Experiment) a Burning in the Flesh, and a Shortness of Breath; they all went off, and in 5 Days time she seem'd perfectly recovered.

Thus we see a Quantity of ℥iiij. of warm Water has been injected into the *Middle Venter* of the same Grey-hound, within the space of One Month; and if we may be allow'd to judge of the Recovery by a perfect cessation of all Symptoms, as to outward Appearance, we must then grant, that this Water was carry'd off thence, some way or other, in the same time. I shall only add, that having order'd the Grey-hound to be ty'd away, after one of the two last Experiments, within 2 or 3 Days, I observed the Boards of the Floor where she lay to be very wet, which I then imagin'd to be the Effects of the Injection, come off by Urine; Perhaps as Nature hath furnisht us with Vessels to bring off that Humour which is thrown into the *Ventricles* of the *Brain*, and by tarrying there would prove fatal to us, so likewise there may be some *Ductus* yet unknown (to me at least) which belonging to the *Thorax* may convey off thence what Liquor arises (either from the Condensation of Vapours, or from the Rupture of *Lymphaticks* or any other Way,) in the Cavity, mediately or immediately, into the Blood: Certainly these Experiments, as also the many Histories of *Empyemas*, and *Dropsies* of the *Breast*, mention'd by Physicians as cur'd by large Evacuations by Urine, do in some measure argue the Probability of such a Passage.

The Passage of
Chyle to the
Breasts; by
M.
n. 65. p. 2083.

XIV. A German at *Montpellier* hath discover'd the Vessels, which convey the Chyle to the Breasts of Nursing-Women; and shew'd, that they do issue out of the *Ductus* of M. Pecquet.

A sudden and
excessive Swel-
ling of a Woman's
Breasts; by Dr.
W. Durrton. n.
32. p. 1047.

XV. *Eliz. Trevers*, 23 or 24 Years of Age, fair of Complexion, brown Haired, of an Healthy Constitution, low of Stature, of Honest Repute, but of Mean and Poor Parentage near *Plymouth*, went well to Bed *July* 3. 1669. and took good Rest and Sleep; but in the Morning, when she awaked, she found her Breasts so swell'd and Heavy that she could not turn herself in her Bed, or sit up; yet without all Pain and Weakness, either in her Breasts, or in any other part. I advis'd for the

the present only an Emollient and temperately warm *Fævus*, and once I gave her a *Bolus*, upon which she had 10 Motions *deorsum*, and the Swelling somewhat abated; but the Maid was so weaken'd upon it for 2 or 3 Days after, that I durst not attempt any thing of that Nature since: *Sed quia passa fuit Suppressionem Mensium per sex retrò Menses, Diuretica nonnulla, & Sanguinis Menstrui Prolectamenta præscripsi.* The *Tubuli* or Pipes of the Breasts are all very hard and swell'd; and indeed the whole Breasts seem to be nothing else but those *Tubuli*, and little or nothing but Wind or Water. As near as we can guess, the Left Breast weighs about 35 Pounds, but the Right somewhat less. And the Skin of the Back, Neck, and Belly, seem to be drawn towards the Breasts to serve for the Distension. The Circumference of the Right Breast is 2 Foot 7 Inch. of the Left 3 F. 1 $\frac{1}{2}$ Inch. The length of the Right Breast from the Collar Bone 1 F. 5 $\frac{1}{2}$ Inch. The length of the Left Breast 1 F. 7 $\frac{1}{2}$ Inch. The breadth of the Right Breast, as it lyes, 1 F. 1 Inch. The breadth of the Left 1 F. 4 $\frac{1}{2}$ Inch.

About the beginning of September, she brought up, in Coughing, at several Times, some Blood; but this I soon took off; and at that Time there appear'd several cutaneous Ulcers upon her Breasts and other Parts, & *abunde in Verundis (ut a Fæminis edocebar,)* which last I cured; but those on her Breasts in Part remain, and daily discharge, by the Sole Application of Cole-Leaves, good Quantity of Sanious Matter. She complain'd also of grievous Interjuncture Pains, especially upon the *Tibia*, whereupon I apply'd *Empl. de Ran.* and gave her 3 succeeding Mornings a Dose, which the 3d Day wrought, *Sursum deorsum*, pretty briskly; after which her Pains vanish'd, and many of those *Ulcuscula*; and her Breasts, which at that Time were grown considerably bigger and very painful, much lessen'd; and her Pains also: But *Oct. 21.* she dy'd. The next Morning we took off the Left Breast, and found it of 64 $\frac{1}{2}$ lb Weight. Upon the opening of it (in several Places) we could find neither Water, nor Cancerous Humours, nor any thing Vitious, more than the prodigious Bigness; and the *Tubuli* and *Parenchymous* Flesh were purely White and Solid, and no other than what we see in the soundest Breasts of Women, or the best Udders of other Animals. She had lost her Stomach and Rest several Weeks before, and made great Complaints of her Breasts, from their great Distension; and her whole Body was exceedingly Emaciated. The Breadth of her two Breasts (as she was laid out on a Table, being Dead,) I mean from the further End of the one to the further End of the other, was 3 Foot 2 $\frac{1}{2}$ Inches. The Circumference of the Breasts long-ways 4 Foot 4 Inches. The Circumference of the breadth 3 F. 4 $\frac{1}{2}$ Inches. The Right Breast we took not off, but we guess it weighed 40 $\frac{1}{2}$ lb.

Some time before she dy'd I began a *Salivation* with her, which lessen'd her Breasts in Circumference some Inches; but she proving not conformable, I was forc'd to desist. But she was wonderfully reviv'd afterwards for some time. I then caus'd a *Cautick* to be apply'd, upon which the *Eschar* falling off, yet nothing issu'd out of the Breast. Then an Incision was made

n. 54. p. 1077. made 2 $\frac{1}{2}$ Inches deep, but 'twas to no more purpose than the former. I design'd to have examin'd the *Visera*, but her Aunt (a fond extravagant Woman) disappointed me. But indeed I believe there was little or nothing there extraordinary. For to the last, I could perceive no ill Smell from her Breath, or Streightness upon the Chest, or Painfulness in her Breathing; and the *Egesta per Urinam*, &c. were well enough.

An Aged Woman of 60 Years giving Suck to her Grandchild in Germany; by . . .
n. 105. p. 100.

XVI. Having taken a Nurse for my little Girl, the Boy of that Nurse having been on that Occasion Wean'd, did by repeated Sucking the Breasts of his Grandmother, a Woman of 60 Years of Age, cause such a Commotion in her, that abundance of Milk ran to her Breasts for a sufficient Nourishment to the said weaned Boy, whom also my Nurse, his Mother, after she return'd Home upon the Death of my Girl, now again gives Suck to, though her Breasts had been for some Weeks dry'd up.

Ibid.

N. B. This Relation was sent by a Person of great Veracity: and may be confirm'd by two other like Stories recorded by *Diemerbroeck*, in his *Anatome Corporis Humani. Lib. 2. Cap. 2.*

XVII. A Paper Omitted, viz.

n. 105. p. 102.

A Relation concerning a Woman of 66 Years of Age, who gave Suck to her Grandchild; and another Woman, who recover'd her Milk after it had, for 8 whole Months, been quite dry'd up, *Extracted from M. Diemerbroeck's Anatome Corporis Humani.*

XVIII. Accounts and Emendations of Books Omitted.

n. 28. p. 534.

I *Job. Swammerdam. M. D. Amsterodamensis, de Respiratione & Usu Pulmonum.*

n. 41. p. 833.

2. *Tractatus duo, prior de Respiratione; alter de Rachitide. Mayow.*

n. 105. p. 110.

Oxon. 1668. in 8°.

n. 56. p. 1142.

3. *De Respirationis Usu Primario Diatriba; Auth. Malachia Thruston. M. D. Cui accedunt Animadversiones à Cl. Viro in eandem conscriptæ, una cum Responsionibus Authoris. Lond. 1670.*

n. 142. p. 1072.

4. *Aviśāsteśāṇ five Animadversionis in Malachiæ Thrustoni M. D. Diatribam, de Respirationis Usu Primario. Auth. Georgio. Entio. Equ. Aur. M. D. Lond. 1679. in 8°.*

n. 65. p. 2093.

5. *An Epistolarly Address made to the G. Duke of Tuscany, touching the whole Doctrine of Respiration; by Laur. Bellini. at Pisa.*

n. 70. p. 2141.

6. *Novæ Hypotheseos, de Pulmonum Motu & Respirationis Usu Specimen. Lond. 1671. in 8°.*

n. 127. p. 67.

7. *Job. Nicolai Pecblinii, M. D. de Aeris & Alimenti Defectu, & Vita sub Aquis, Meditatio. Kiloni. 1678. in 8°.*

n. 73. p. 2211.

8. *De Catarrhis à Rich. Lower. M. D. in 8°.*

n. 77. p. 3017.

9. *Phthisiologia Lancastriensis; accessit Tentamen Philosophicum de*

n. 1002. p. 206. *Aquis Mineralibus, &c. Auth. Carolo Leigh, M. D. Lond. 1694, in 8°.*

10. Tra-

10. *Tractatus de Corde, item de Motu Colore Sanguinis, & Chyli in* N. 45. p. 999.
N. 73. p. 221.
cum transitu : Cui accessit Differtatio de Origine Catarrhi. Auth. Rich.
Lower, M. D. Lond. 1669. Amstel. 1671. in 8^o. A Correction is here made
of an Error of the Press, concerning the Circulation of the Blood, which passeth
through the Heart Thirteen (not Six) times in an Hour; and of a Mistake
committed by the Author himself.

11. *Pet. Cbirac. de Motu Cordis Adversaria Analytica. Montsp. 1698. N. 263. p. 556.*
in 12mo.

12. *Ejusdem Differtatio Academica; An Incubo Ferrum Rubiginosum? N. p. 565.*
Montsp. 1694. in 12mo.

CHAP. IV.

The Abdomen.

I. **S**ept. 14. 1678. Opening the Body of a Reverend Clergyman at Ox-
 ford, we observ'd the *Liver* to be very large, and fasten'd to the
Diaphragme more than usually; the *Colon* so firmly joyn'd to the *Liver*,
 near the Gall-Bladder, that I could not separate it without Incision. The
 Gibbous Part of the *Liver*, towards the Right Side, appear'd discolour'd,
 where, making an Incision, there plentifully issu'd out a perfect Pus, ve-
 ry Foetid; as likewise there did from a Wound I made in its Cavous
 Part near the Fissure. This Purulent Matter I found not contain'd in any
 particular *Cystis* or Bag, but in several *Sinus's* in that Part of the *Liver*;
 whereas the other Parts seem'd Sound and well Colour'd. This Abscess
 may well be presum'd the Cause of that lurking Fever that took off the
 Patient, he labouring under it above 6 Weeks, yet without much Com-
 plaint of Sicknes, but troubled with irregular Heats, yet sometimes such
 as were imperceptible to himself: Twice or thrice, but at great Distances,
 he had Paroxysms of Chill Fits like an Intermittent Fever, but such a Factor
 and Dryness in his Throat as prov'd obstinate to all Medicines. His ap-
 proaching Death was attended with other Symptoms that usually follow
 the Affection of the *Brain* and *Genus Nervosum*.

*An Abscess in
the Liver, Stones
in the Gall-Blad-
der, and conjoined
Kidneys; by Dr.
Edw. Tyson. N.
142. p. 1035.*

Formerly he had been often subject to the *Yellow-Jaundice*, tho' at
 present nothing thereof appear'd. The *Gall-Bladder* was fill'd and
 cramm'd with Stones, the *Meatus Cysticus* and *Ductus communis* even to
 the *Duodenum* were very much extended with them; and in the *Porus*
Biliaris also I met with several small ones. There was no Fluid Gall
 contain'd in the *Bladder*, but some that was soft, of a deep Yellow-Oker
 Colour that fill'd up the Interstices of the Stones. These Stones were of
 a various Bigness, from that of a large Nut or Nutmeg, to a Pepper-
 corn: Their Colour was of a darkish Yellow-Oker, altho' in some
 there appear'd *Laminae* of a Browner Colour: To the Touch, when a
 little dry, they seem'd Soappy; their Weight was Light, and their Scent

very Foetid, resembling that of the *Purulent Matter* in the *Liver* ; Their Consistence was Friable ; Their Figure for the most part Triangular, or inclining to that Figure, but all Angular ; That Side toward the *Gall-Bag* was Protuberant and Convex, the other two Sides were Flat ; So that having the lesser Angle towards the Centre of the Cavity of the *Gall-Bag*, like so many Wedges, they more compleatly fill'd it ; I number'd I think above 30. Whether this *Triangular Figure* may be from the shooting of some *Salts* in the *Gall*, is hard to determine : But however, I suppose, 'twill be found, that they usually affect this *Figure* ; as in some others I have by me, taken out of the *Gall-Bladder* of a Woman at *Oxon* some Years ago, it does more plainly appear, which are also Light, do feel Soapy, consist of *Laminae*, are of a Whitish Colour, not ill Scented as the former, and of a *Triangular Figure*.

Fig. 11.

We were surpriz'd to observe an unusual Structure and *Conjunction* of both *Kidneys*, the *Parenchyma* of the one being continu'd over the *Spine* unto the other, so that they both made but one continu'd Semilunary Body. They were very large, and that Part that conjoyn'd them, and lay over the *Spine*, was something lesser than the true *Kidneys*, and in its outward Tunicle or Membrane had 3 Seams, although that *Parenchyma* inwardly seem'd not to observe such a Division, but was the same with the Substance of the *Kidneys*. The *Emulgent Vessels* were very numerous ; for, besides two larger Veins that were subdivided into several lesser Ramifications, there were divers other that were single, even to their Insertion into the *Vena Cava*. The Middle part likewise, by which both *Kidneys* were Conjoyn'd, was plentifully provided with Blood-Vessels, for it received from the *Aorta* two Arteries, which before their Insertion were each subdivided into 3 Branches ; and it sent out two Veins, which being joyn'd afterward into one entered the *Vena Cava*. Besides, at the Seam at the lower Part of the Left *Kidney* it had a Vein and Artery, which afterwards inserted themselves into the *Iliac* Branches of the *Aorta* and *Cava* ; so that Nature, though erring from her wonted Rule in forming this Part, yet was Provident in furnishing it with Vessels. But to the whole Compages of the *Kidneys* there belong'd only two *Ureters*, but the great Dilatation of the *Pelvis* in each was remarkable ; that of the Left *Kidney* was the larger, and had a triple Origination, the Right had but a single one, and was less.

I am apt to think that this Structure of the *Kidneys* might occasion as well the great Dilatation of the *Vena Cava*, as also of the *Pelvis* : For the Middle Part conjoyning both the *Kidneys*, lying over the *Vena Cava*, by its Weight pressing thereon would hinder the free return of the Blood, which yet would make room for itself by enlarging its own Channel, which was so capacious as to contain 3 or 4 of my Fingers. So likewise the *Ureters* running over that Part that Conjoyns the *Kidneys*, like Strings over the Bridge of a Viol, in some Position of the Body they might have their Passage so streightned, that the *Urine* being impeded and regurgitating might swell and stretch the Membrane of the *Pelvis* to this Greatness.

A, The Right Kidney. *B*, The Left. *C*, The Middle-Part Conjoyning both Kidneys. *d e f*, Three Seams in the Tunicle of the Kidneys. *G*, The Arteria Aorta. *h h*, Two Arteries from the Aorta, which afterwards are Ramified into three, and so inserted into the said Middle-Part. *I*, The Vena Cava. *K K*, Two Veins arising from the Middle-part, which uniting into one enter'd the Vena Cava. *L M*, A Vein and Artery arising at the Seam *f*, which at last are both inserted into the Iliac Branches of the Aorta and Vena Cava. *N M*, The Emulgent Arteries. *O O*, The Emulgent Veins; whereof some are single, others variously Ramified. *P P*, The Pelves of both Kidneys; that of the Left was extream large. *Q Q*, The two Ureters.

Explication of
the Figure.

II. I send you here the Figure of the Liver of an Hydropical Person. He was about 25 Years of Age, a Soldier in one of his Majesty's Regiments here in Town, who contracted his Distemper by Drinking much Water, when he could not stir from his Duty, and catching Cold at Nights in being upon the Guard. He was under the Care of our Physicians in St. Thomas's Hospital for some Time, by whose Directions his Swellings did by times abate; but afterwards it was observ'd, that the Method, which had been beneficial to others, had not here the like Success, his Swellings returning upon him as before; so that there was nothing more now to be thought of but a *Paracentesis*; which Operation however we judg'd very hazardous, by Reason of the Time of the Year, and for that the Patient was very much Emaciated; yet he being so much Swell'd that it was uneasy to him to lie in his Bed, he importun'd us very often, and with great Earnestness, that the Operation might be perform'd. Hereupon a *Paracentesis*, by the Physicians Consent and Directions, was made by me, Nov. 24. 1685, whereby we drew from the Patient about 3 Pints of Brinish Liquor, and within 4 Days after as much more; the next Morning he died; and his Death, as was found upon Dissection, was partly occasion'd by a Mortification upon his Scrotum and Penis. Upon Opening the Body, I believe I took out about 24 Quarts of Water; he had a large Inflammation upon the Peritonæum; all his other inward Parts not much disaffected, except the Liver, which now I am going to describe to you.

A Liver appearing Glandulous to the Eye; by Mr. J. Brown. n. 178. p. 1266.

Its Magnitude was not extraordinary, but rather seem'd less than usual. But that which was very remarkable (and I think the like Case scarce ever observ'd by any Author,) and seems much to confirm the Opinion of the Learned *Malpighius*, is this; It consisted, in its Concave, Convex, and Inward Parts, of Glands, which (with the Vessels) made up the whole Substance thereof; these Glands contain'd a Yellowish Ichor, like so many Pustules, and was I suppose part of the Bilious Humour lodg'd in the same, tho' otherwise the Liver, between the Glands, was of its usual Reddish Colour. In the Bladder of Gall we found a soft friable Stone, but otherwise nothing considerable in that Part.

Fig. 12,

AAA, Describes the Glands in the Concave Part of the lesser Lobe of the Liver. *BBB* The Glands in the Concave Part of the greater Lobe of the Liver; which were of different Magnitudes, tho' in general they were

Explication of the
Figure.

much less in the lesser than in the greater. CCCC, The inward Part of the greater *Lobe* of the *Liver*, as it was divided. DDDDD are several Black Specks that appear'd inserted in those *Glands*, which were probably from the Divarications of the Vessels being divided upon opening this *Lobe*. E, The *Vesicula Fellea*, which was of a Greenish Colour, F, The *Vena Porta* ty'd up with the *Ductus Biliarius*, &c. G, A particular Set of *Glands*, lodged between the same and the *Vena Cava*. H, The *Vena Cava*. I, Part of the *Ligamentum Suspensorium*. The Convex Part of the *Liver* was, in every Respect, the same with the Concave Part of both *Lobes* as to its *Glands* here describ'd.

The *Structure* of
the *Spleen*; of S.
Malpighi. n. 71.
p. 2150.

III. *Lienis* *Fibras*, quæ tot *Ingenia* torsère, nequaquam *Nerveas*, (quod & ipse aliquando autumavi,) sed *Carneas* esse, deprehendi; ita ut ex *Carneo* exteriori *Involucro*, & productis transversaliter *Fibris*, mirabilis fiat *Musculus*, *Lienis* *Cellulas* comprimens, quo *Sanguis* per *Splenicum* *Ramum* propellatur, non ob simili *Structura* ac *Ritu*, qualis in grandioribus *Cordis* *Auriculis* observatur: *Carnei* enim *lacerti*, per transversum ducti, suarum *Fibrarum* implicatione *Rete* efformant, *Membraneas* *Cellulas* comprimens, suisque extremis *Finibus*, mirabiliter productis, *Carneum* *Involucrum* constituunt.

The *Use* of the
Spleen; by M.
Mich. Behm, N.
34. p. 651.

IV. *Lienem* Dn. *Higbmorus* & alii merito absolvunt ab *Acido Melancholico*, atque *Sanguificatione*. Vidi aliquoties *Lienem*, calentem adhuc, *Pulmonum* imitari *Spongiositatem*, & non *Aëre* solum, sed & coloratis *Liquoribus* valde distendi posse; quo facto magis patent ejus *Vasa* atque *connexiones*, *Uususque* a Dn. *Higbmoro* expositi. De eo tamen, pace *Acutissimi Viri*, modeste ambigo, an plurima ista *Albicantia Vasa* sint *Nervi* *Spiritu Animali* turgentes, vel potius *Fibræ Tendinum*, *Dilatationi* & *Contractioni* servientes, uti in *Pulmonibus*. Opinor etenim *Sanguinem*, qui in *Corde* non satis cum *Chylo* miscetur, in *Liene* tanquam per *Spongiam* crassiorem *Colari* & misceri plenius, & aquosa pauca per *Pancreas* seponi, & tandem in *Hepate*, iterata *Colatione Bilem* secerni. Et quando per *Motum* aut vehementes *Affectus* *Sanguis* in *Corde* nimis ebullit, tunc, ne ille *Cor* opprimat, aut nimio impetu *Caput* infestet, magnam partem recipit *Lien*, ut ejus intumescencia cum *Pulsu*, *Cor æmulante*, & *Calore* intenso, à quovis sentiri queat. A vitiis *Mesenterii* & *Hypochondriaco* *Malo Lienem* & *Diaphragma* infici credo, sed nunquam vel raro ista *Mala* à vitiis *Lienis* provenire putem.

Observations
about the *Spleen*
and *Liver*; by S.
Jacomo Grandi,
N. 58. p. 1188.

V. In my *Anatomical Dissections* of the first Year, after I was made the *Publick Anatomist* at *Venice*, I met with nothing Curious, but the *Virsungian Channel* manifestly inserting itself in the *Spleen*, and admitting a *Silver Stillatto*; which I had never observ'd in any Corps: And then a *Liver* divided into 5 *Lobes*, together with a *Spleen* of the Figure of a Saw, of extraordinary Bigness. O Last Year, one Drown'd, of about 35 Years of Age, had the *Lacteous Vessels* so apparent and so big, that having shewn them how they lay in the Body, I shew'd them yet the Day after in the *Mesentery* taken out and display'd upon a Table.

VI. D.

VI. D. *Tho. Sedgwick*, Mercatoris *Lond.* Filia, 14 suæ *Ætatis* Anno, ad Operum Acupictorum Magistram se erudiendam contulit; in quibus adeo miræ fuit Indolis, ut iis solis totos dies, eosque ferè continuos, per Biennium infumeret. Hinc *Melancholicum* Temperamentum connatum in Morbo-
sum transiit: Quod Pallor, Inappetentia, Mensium Defectus, atque Tussis, comitabantur; & post tres Annos gravativus Dolor, in Sinistro infimo-
que Latere, qui ad extremum usque diem perstitit. Anno autem *Ætatis* Vicesimo ineunte, ex Febre obiit. In aperto Cadavere, *Pulmones*, *Fecur*, reliquaque *Viscera*, excepto solo *Liene*, sana inveni. Hoc vero mirum in modum auctum & tumefactum; nempe crassum supra duos Digitos; qua-
tuor latum; longum prope decem. Ita ut, cum *Lien* Humanus, quoties se recte habet, vix 5 Uncias pendeat, in hac Virgine 25 superabat. Et cum hoc Viscus, sicubi ægrotet, Tumoribus *Schirrosis* & subnigris plerum-
que indurescat; hic è contra tota ejus Substantia putrescens quendam emittebat Fœtorem; mollisque adeo fuit ac Digitis palpantibus dissolubi-
lis, ut videretur quasi Grumosus Sanguis; atque altera pars à prehensâ alterâ etiam suo Pondere disrumperetur. Nihilominus, tam exterius quam intus, Rubicundo floruit Colore, neque ullo *Apostemate*, aut *Materiâ* verè Purulentâ, inficiebatur.

In hoc Casu isthæc tria sunt consideranda, viz. Vitæ Genus, *Ætas*, *Ætatisque* Periodus. Primò enim à tam diuturna Exercendi Desuetudine, vix potuit non evenire inæqualis Alimenti Distributio. Quemadmodum itaque Ossa, & sæpe Viscera, ex inepta Nutritione, supra modum augen-
tur in *Rhachitide*: Pariter & hic *Lien*, ex eodem Nutritionis Vitio, vide-
tur ampliorem Molem accepisse. Præcipue cum, Secundò, hæc Vitæ Consuetudine usa est illa Virgo, non in provectiori *Ætate*, sed florente adhuc Adoscentiâ. Exercitia enim necessaria sunt, etiam ad debitam Nutritionem: Multo magis ad Partium æquale Incrementum. Tertio, & in illa ipsa *Ætatis* Periodo, quâ Menses primò effluere solent: Quibus inde suppressis, vel multum imminutis, iste Sanguis, quem desidiola Na-
tura omisit eliminare per consuetas vias, ex parte in *Lienem*, quasi quod-
dam Diverticulum, rejiciebatur. Virginibus itaque nimia Exercitiorum Intermissio, imprimis circa finem Secundi, aut principium Tertii *Ætatis* Septenarii, pessima.

VII. Canis Anatome privato quodam *Oxonii Collegio* habita, prope *Lienem* in Orbiculare quid incidimus; quod *Glandulam*, prima facie referebat. Erat illi tres Uncias Diameter; Tunica, qualis Venarum. Hoc illoque latere, Venam conspeximus, Splenicæ nempe Ramorum alterum, in Or-
bis istius Tunicam, abeuntem. Aperti Carneam obtuemur Substantiam; sed rudem, imperfectam, Grumis interspersam. Per medium, Iter San-
guini concessum. Incremendi tempus diutinum arguit Magnitudo.

VIII. As I have Opportunity, I shall shew, I hope, that all Sorts of Glands (so called) are nothing else but Vessels, (and their Liquors) vari-
ously wrought, and Receptacles of several Liquores for divers Uses; the
Difference

A Diseased Spleen; by Dr. Neh. Grew. N. 194. p. 543.

A Polypus in a Dog, near the Spleen; by Dr. Will. Mufgrave. N. 266. p. 690.

The Structure of the Glands; by Sir Edmund King. N. 52; p. 1046.

Difference of which alters their Colour, Consistence, &c. My meaning is, that there is no reputed *Gland* any other thing than in the Body of the *Testis*, viz. That it hath not this or that intermediate Substance, but that the Liquors regularly come and go and through them in fine Tubes, (in such and such Heaps and Figure, as may take, as make them appear so and so form'd in several Parts of the Body, where they are situated;) as also, that the more conspicuous Vessels of the Body have other Vessels that help to make up their Coats, and serve for the Nourishment of the same, besides such as import or export those Liquors, for the Conveyance of which they were design'd for common Use.

The Use of Glands;
by Gasp. Bartho-
line. n. 164. p.
753.

IX. Illa, quæ de *Pancreatis* Ductu ejusque Succo Recentiorum diligentia invenit, viam aperuerunt reliquarum *Glandularum* & Vasis inveniendis & Usui agnoscendo. Nec enim amplius habenda est *Glandula*, ubicunque in Corpore nostro reperiunda, pro parte Corporis vel otiosa, vel superfluis humoribus destinata, sed potius quasi pro Cribro quodam secernente à Sanguine Humorem conservationi Individui maxime necessarium. Nimirum cum per Arterias ad singulas Corporis partes deferatur Sanguis, & antequam per Vasa Capillaria Venarum ab iisdem redeat, varias in nonnullis partibus deponat particulas, quæ per Vasa peculiaria (Excretoria communiter dicta Anatomicis) excluduntur, proprie Cribri nomen meretur illa circumfusa materia, quæ inter Capillaria Vasa Arteriarum & extrema Oscula Vasorum Excretoriorum intermedia est, quæque efficit, ut transitus fiat, non totius Sanguineæ massæ, sed quarundem saltem ex ea secretarum partium, diciturque alias *Parenchyma*, affusio, vel caro viscerum. Ita in Sanguine, post diversorum Humorum in se mutuam actionem, diversi generis particulae à tota massa separatae, in singulis Cribris sibi convenientes meatus inveniunt. Et, qui bene hanc generalem Cribri descriptionem animo comprehendit, simul intelliget Viscerum omnium, quæ Vasè Excretorio prædita sunt, conformationem. Talia autem sunt illa Viscera quæ vulgo *Glandulae* vocantur, quæque recepta hactenus distinctione dividi solent, ratione conformationis, in *Conglobatas* & *Conglomeratas*.

Conglobatae Glandulae illæ dicuntur, quæ æqualem habent superficiem, ex una quasi sibi continuata substantia conflata, & quæ Excretoria habent ejus generis *Lymphatica* Vasa, quæ à B. M. Parente meo quondam inventa & descripta sunt. Illorum autem *Lymphaticorum* per *Glandulas* has *Conglobatas* talis observatur Distributio. Quædam à primis suis Fontibus in *Glandularum* superficiem sparguntur; quædam à concava parte unius *Glandulae* in alterius convexam partem pergunt; quædam iterum ab earundem *Glandularum* parte concava ad locum insertionis in *Venam Cavam* exporriguntur, idque vel immediate, vel per intermedium *Thoracicum Ductum*. Ita omnia hæc *Lymphatica*, quæ à Sanguine secretum in *Glandulis Conglobatis* Humorem excernunt, eundem in Sanguinem iterum facto quasi Circulo reducunt. Reperiuntur tales *Glandulae* in *Mesenterio* inter vasa excipientia Chylum ab Intestinis & Receptaculi Lumbaris radices circa *Venam Portam*; inter *Lymphatica Hepatis*, & ejusdem Receptaculi radices;

dices; in Lumbis, Inguinibus, circa Pulmones, in Mâxillis, in Collo, supra Fauces, sub Alis, in Omento, alibique. Memini me quondam in *Nosocomio Florentino*, in Fœminino Cadavere, *Glandulas* duas *Conglobatas* cum suis *Lymphaticis* insignis atque notabilis magnitudinis inter Cutem & Musculos *Abdominis* in Ilio Sinistro in pinguedine reperisse. In alio *Hydropicæ* Cadavere, ibidem à me aperto, *Abdominis* Cavitas aqua copiosa repleta erat, *Glandulæ* verò omnes, quæ ubique latitantes præter solitum multiplicatæ, mihi videbantur Schirrosæ & Materia Purulenta refertæ: Mirari subiit insolitum *Glandularum* numerum & magnitudinem præternaturalem. Et quod ad hanc attinet, illam materiæ contentæ, in hoc Affectu ita *Glandulas* distendenti, attribui. De insolito verò *Glandularum* Numero dubium habui, an ullæ in corpore *Glandulæ*, non ibi ante existentes, novæ procreentur, an verò antea parvæ solum & quasi *Miliares* latentès ita interdum augeantur, ut oculis clarius paterent, quemadmodum de Mammarum *Glandulis* certum est, quæ in omnibus dantur, sed in aliis conspectiores sunt.

Certe *Conglabatarum* vera notitia non parum inservit Affectui difficili explicando, nimirum Scrofulis, & iis quæ circa Scofulas observantur. Non raro enim videre contingit ingentes sacculos intra *Conglobatas Glandulas* contentos, plenos Materia vel Flavesciente vel Gypsea; adeoque facile agnoscitur crassiores Lymphæ partes; dum per *Glandulas* Cribrantur, nec transicum patentem inveniunt, sensim ibi collectas sacculos formare. Quod vero dicunt de consensu *Glandularum* Colli & *Mesenterii*, dum ut plurimum existentibus in Collo Scrofulis similes etiam in *Mesenterio* reperiuntur, non fit per communicationem quandam immediatam inter Collum & *Mesenterium*, aut per occultas Sympathias, sed idem Sanguis in omnibus ejusdem Naturæ *Glandulis* ejusdem generis Contenta deponit. Unde sequitur, quod Materia existente Pauca, vel una tantum afficiatur *Glandula*, vel multæ simul, sed obscure: Materia autem existente Copiosa, plures simul *Glandulæ* eadem repleantur; atque mutata deinde Sanguinis natura per liquores resolventes, resoluta in *Glandulis* dicta Materia, Humores evanescunt.

Conglomeratæ Glandulæ ex variis quasi partibus & minoribus *Glandulis* cum aliqua superficiei inæqualitate, constantes, sola *Lymphatica* evehencia habent, sed alterius plane generis ac priora illa, quippe quæ in peculiare cavitates liquorem, à Sanguine in *Glandulis* Secretum, immediate deponunt; ut *Salivales* in Oris cavitatem, & *Pancreaticæ* in Intestinum *Duodenum*. Atque hujus generis *Glandulæ* omnes, quarum saltem Vasa Excretoria hætenus nota sunt, suppeditant humorem, quo mediante assumptorum prima resolutio instituitur. Unde in Ore præcipue & per totum Ductum viæ Alimentorum tales *Glandulæ* vel parvulæ variè sparsæ, vel in Corpora insignia coagmentatæ reperiuntur. Et si quæ videantur extra Canalem Alimentorum sitæ, ut *Glandulæ* Oculorum & Narium, tamen ubi illarum humor Palpebras inunxerit & in Nares delapsus (per Vasa dicta olim puncta *Lachrymalia*) cum Narium humore particularum Odoriferarum perceptioni servierit, in Canalem Alimentorum (per viam à Naribus in Os patentem) tandem derivatur, quo etiam ex Naribus effluens humor deducitur.

Ipsam

Ipsam Glandularum Structuram si attingamus, utique multa nobis imponere specie Carnis, communiter ita dictæ, deprehendemus, quæ revera sunt Vasa Excretoria, uti contingit in Renibus, monente *Malpighio*. Etenim, quemadmodum in Renibus peculiaris illius Substantiæ, quam pro Carne habuerunt Antiqui, maxima pars constat ex minutis canaliculis & meatibus, per quos Urina in Pelvim affluit, & quibus circumpositum est verum Cribrum Glandulosum pro secernenda Urina; ita etiam magna pars illius Substantiæ, quam quasi peculiarem Carnem vel Parenchyma in *Glandulis* consideramus, componitur ex variis Tubulorum Glomeramentibus & Vasis Excretoriis Lymphaticis, Nervis, Vasis Sanguineis, addo & Fibris Carneis, quibus non solum investiantur *Glandulae*, sed & eas Substantiæ suæ intertextas habent.

The Spiral Structure of the Fibres of the Intestines; by Dr. Will. Cole. m. 125. p. 603.

X. The Mechanical Reason of the *Peristaltick* Motion of the Intestines is by some Anatomists deduced principally from *Annular* Fibres, constituting, according to the received Doctrine, one of the Coats of them. Others are of Opinion, that they are rather numerous though small *Sphincter* Muscles than single Fibres, to which that Motion is to be attributed; Muscles being in most, if not all other Instances own'd to be the equated Instruments of Motions Analogous to this; and Fibres, tho' absolutely necessary, yet being no otherwise so than as (a Number of them being collected, and fitly disposed) they constitute a Muscle. But I found it very difficult to conceive how the Actuating Matter could be transmitted from one Fibre or Muscle to another down along the whole Tract of the Intestines, since, according to this *Annular* Supposition, each single Fibre or Muscle must be distinct, a latent Contiguity being all that can be pretended. This, and many other Difficulties which occur'd to me, put me upon a stricter Examination. I made the first Experiment in a Portion of the upper *Intestines* of an Ox, which, by Reason of their Largeness of Proportion to those of most other Species of Animals, seem'd fittest for the Tryal; afterwards in those of Sheep and Calves, and not only in the smaller *Intestines*, but in the *Colon* and *Cæcum* also. The Circumstances and Result of which Tryals are as follow:

To effect a due Dis-junction of the Membranes and Fibres (which I found 'twas hard, if not impossible, for me to make while 'twas raw) I was fain to cause the *Intestines* of Oxen to be boil'd 5 or 6 Hours, of Sheep 4; whereby the Compages of the Parts were so loosen'd, that the two outward Coats, *viz.* The common one and that consisting of *Right* Fibres, were easily separated (if it were attempted soon after it was taken out of the Water) from that to which my search was destined, and left those reputed *Annular* ones naked; (though, by the Way, too long Coction would prove prejudicial on the other Hand, by too much intenerating the Fibres.) These at the Top of the *Intestines* I attempted to separate from one another, and when those that had been decurtated by the unequal Cutting of the Knife were taken off, I found,

1. That

1. That I could not separate a single Fibre from his Fellows to any considerable Distance, all of them (to my Observation) being very small, and in the Separation running smaller and smaller, and withal by reason of their Implication or stricter Cohesion one with another easily breaking; but a Congeries of them, to be observ'd especially, though not precisely always, in those Places where, by gentle extending the *Intestine* several times, and then letting it return again, the Cohesion of the several Series of them became loosen'd) which, at first View, would resemble a pretty large Fibre, would, without much Difficulty, rise together; the very small constituting Fibres of which Clusters, yet if the Boiling had been very long continu'd, whereby the Compages was very much relax'd, would, in the raising, be very apt to separate from one another, and appear distinct by reason of their Insertion by and by to be mention'd.

2. That when beginning at the Top, I attempted the Separation of one of these (suppos'd *Annular*) Clusters of Fibres towards my Right Hand (on that Side of the *Intestine*, I mean, which was turn'd towards me) a whole Ring would come off together, (excepting that some *Fibrillæ*, which rising from contrary Parts, decussated one another at the Top in that *Phasis*, would a little retain it) but endeavouring it towards my Left, I found, for the most Part, I could easily enough unravel that Cluster to a considerable Length, *viz.* that of sometimes more than two or three Spans, before Ruption (of the whole Cluster I mean) which yet at last 'twould be subject to. For,

3. Though those Convolutions, as to the greatest Part of them appear'd distinct, yet I found, that from every one of them, at short Distances, some Fibres did obliquely, and the most of them, to my best Observation, according to the Course of those I have mention'd, insert themselves into the next Convolution, and become a Part of it; though withal some I observ'd to have a contrary Tendency, and rather seem'd to ascend from the lower to the upper Convolution, and help to constitute it, and so to observe the Course mention'd; nay, sometimes would go further than the next Convolution, and running under it, apply themselves obliquely to some higher, which yet being in a smaller Number than the rest that lay in the Order contrary to them, did not very much hinder the Dissociation of the main ones: Which Fibres breaking off, and that in some Places in greater Numbers than in others would at last (and the sooner if the *Intestine* began to grow dry, which it would quickly do) cause the whole Cluster to break off.

4. I observ'd that as the most of these Fibres would by Degrees, according to the Order of the Convolutions, insert themselves into the next, so some of them would (in the same Order) pass over it, and more (so far as I have observ'd) would run under it, and either adjoyn themselves to some more remote, or elude my Searching by hiding themselves under them. This Insertion of these Fibres seems to be the Reason of these *Annular Phasis*, that I mention'd even now, in the contrary Way of Separation: For the attempting it contrary to their Order, must hinder in some Measure the ready Dissociation of the next Convolutions upwards; especially

cially near the sever'd Extremity, where there is less Resistance of the adjacent Parts; the mention'd Fibres also seeming somewhat bigger, and consequently stronger, in the upper, than after their Insertion into the lower Convolution: Tho' indeed,

5. I found, that if I began at a lower Part of the *Intestine*, and try'd to unravel upwards, there was not much more Difficulty in so doing, than when beginning above, I attempted it downwards; of which the Reason, I suppose, might be the Tenderneſs of the Part occasion'd by long Boiling, whereby I could not perhaps judge of the Degrees of Renitency in those small Fibres. In this contrary Way of Separation too, the Operation, I observ'd, would not succeed unless I attempted it in the contrary Order, *viz.* towards my Right Hand.

6. When before Boiling, I caus'd the Inside of the *Intestine* to be turn'd outward, as I did in two Trials, and afterward by taking off the Glandulous and vascular Coats (which I think to be distinct from one another, as I said before of those consisting of Right Fibres, and the suppos'd *Annular* ones,) endeavour'd to unravel the Fibres, I found they would come off in the contrary Order, *viz.* from my Left Hand toward my Right; which I conceive confirms the Observation above deliver'd, in regard the *Intestine* being inverted, the Order of Separation must be so too; though I found (or thought) the Operation more difficult, by reason of some Fibres lying in the opposite Order (mention'd under the 3d Particular) and in this appearance lying uppermost.

7. In one of these Attempts of unravelling the Fibres of the *Intestine* of an Ox, so inverted, I found, that though the Fibres I took up came off in the Order I just now mention'd, yet running over some others, they made a more oblique Excursion, and for 2 or 3 Convolution left betwixt them a considerable Area of Fibres, amounting (according to my Conjecture) to 5 or 6 times, or more, the Breadth of those that so came off, till going deeper and deeper among the other Fibres, and at last running under them, they could be no longer trac'd, but brake off. Whether this be usual, or only *Lusus Naturæ*, I cannot determine.

8. I found it much more difficult (in that one Tryal I made) to unravel the Fibres of the *Cæcum* than the other *Intestine*, which seem'd more interwoven than those of the rest, and to have contrary Tendencies one among another.

This is the Sum of my Observations hitherto concerning this Coat, which I take leave to think one *Concave* and *Helical Muscle* (if I may so style it:) And that it might be suppos'd such, the foremention'd Insertions seem'd to evidence, they appearing to me in the Separating appositely enough to represent the Fabrick of a Muscle deliver'd by the accurate *Steno*. Where the Tendons of it are fix'd, is not evident; but if I may have the Liberty to Conjecture, I should think the upper of them to be radicated (at least) at the *Pylorus* (if not as high as the *Sphincter Gula*, if this be not it,) since the carneous Coat of the *Stomach* being by the Learned Dr. *Willis*, found to be a Muscular Contexture, and there being a Continuation of Motion between that Part and the *Intestines*, it seems to me not altogether improbable

improbable they may be but one Muscle; and the other at the *Anus*.

XI. In the Dissection of a Dog, in July 1685, I observ'd that the *Peristaltick* Motion of the *Guts* was continu'd thro' the *Stomach*; the *Pylorus* (that usually appears, after opening the Dog, as high as the *Diaphragme*) being in every waving brought below the very bottom of the *Stomach*, I could manifestly observe a Constriction in the Middle of the *Stomach*, at every Motion downward, passing it in so as to be able to compress what was contain'd in its Cavity. And these Motions were as regular and orderly as ever I saw it in the *Guts*. I have since seen the same Motion in 2 or 3 others; so that one may safely conclude it holds true in all. The Motion of the *Stomach*, being after this manner, may give us a clear Account of the Quickness of the Distribution of the Nourishment; the Meat being no sooner open'd by the Spittle and Liqueur that we take in, than that it has a free Motion by the Descent of the *Pylorus* into the *Intestines*, which is almost *pleno flumine* from this Compression in the Middle of the *Stomach*.

The Motion of the Stomach and Guts; by Dr. Chr. Pitt. n. 243. p. 278.

XII. My Son (Mr. J. Wallis of Soundess by Nettlebed in Oxfordshire) had a Horse which in Harvest-time 1695, leaping over a Hedge, chanced to stake himself very dangerously. A Boy being sent for him rode home upon him about 4 a Clock without discerning the Hurt, till (upon his alighting) he found his own Legs bloody, and then discern'd the Wound, somewhat behind the Fore-Legs, a little inclining to one side. When the Farrier (Tho. Bishop Jun. of Wallingford) came, which was not till after 10 a Clock that Night, he search'd the Wound, and after he had enlarg'd it in the outward Skin and Rim of the Belly, he found a Wound in the *Ventricle* or *Maw* at least 3 Inches long; he then remov'd the *Maw* outward, and order'd a Servant to cleanse it from the chew'd Grass and whatever he found in it, as being less likely to Gangreen when empty. The *Maw* being thus cleans'd, the Farrier sowed up the Wound therein, and then thrust it back into the Body; and then sewed up the Wound in the Rim of the Belly: The Wound in the outward Skin he did not sow up, but only tack'd it loosely together about the middle, leaving room on both sides to put in Tents and Medicines for the healing of it. The Horse after this continu'd for some time much indisposed, but in a Month or 6 Weeks time (with careful Attendance) the Wounds were clos'd and perfectly cured; and the Horse work'd at the Plough and other Services as before.

The Cure of a Horse staked into his Stomach; by Dr. J. Wallis. n. 219. p. 178.

XIII. Amongst the Rarities in the *Anatomy-Hall* at *Leyden*, there is preserv'd a Knife 10 Inches in length, which was cut out of a Peasant's *Stomach*, and he liv'd 8 Years after.

A Knife cut out of the Stomach; by Mr. William Clerke. n. 250. p. 97.

XIV. Jan. 3. 1691. One And. Rudloff, a Country Lad near *Hall* in *Saxony*, about 16 Years of Age, playing Tricks with a Knife in his Mouth, it accidentally slipt down his Throat into his *Stomach*. The Knife was in all about 6½ Inches long with a Harts-horn Haft: The

A Knife swallowed by a Lad in Saxony; by ---- n. 219. p. 280.

Curiosity of the Case did oblige M. *Wolfgang Christ. Wesenern*, Physician to the *Electo*r of *Brandenburg*, to take care of him. The Knife was felt to have chang'd its Position several times, and after a few Months ceas'd to be very troublesome, and in about a Year was so much diminish'd, as to be difficult to be felt from without. Not long after an angry Tumour with Inflammation broke out 3 Fingers breadth below the Pit of the *Stomach*, which being Ripened, the *Apoſthem* was opened *May 24. 1692.* and being kept open, the Point of the Knife first appeared thereat *July 18.* following. The Point thay fastened with a Silk-Thread, and the Wound being widened, the Knife was drawn out thereat *Aug. 2.* (a Year and 7 Months after it had been swallowed) and, in a little time, the Lad was perfectly well. The Knife was exceedingly consum'd in all its Dimensions.

Two Copper-
Farthings swal-
low'd by a Child
in Worcester; by
Mr. Hen. Un-
derhill. n. 246.
p. 424.

XV. About 10 Years ago my Son, *Will. Underbill*, Aged about 3 Years, swallow'd, by Accident, two Copper Farthings, but half a Year one after the other. Upon the first Farthing, he eat nothing for 10 Days, and complain'd of a great Pain at his *Stomach*, and drivell'd as if he had been Salivated; and often said, he had a Nauseous Venemous Taste in his Mouth, the Farthing not coming from him in half a Year. After the swallowing of the second Farthing he began by degrees to lose his Limbs, his Breast growing narrow, and the Child Consumptive; who was after perfectly cur'd by the *Bath*, and his Breast dilated and grew broad as before.

A Disease caus'd
by swallowing
Stones; by Sir
Ch. Holt. n. 253.
p. 190.

XVI. 1. In *Feb.* or *Mar. 1693*, one *Tho. Gobsill* of *Shelden* near *Colehill* in *Warwickshire*, (a Lean Spare Man, aged about 26 or 27) told me, that about 3 Years before, he was extreemly tortur'd with Wind: And one Day making a complaint to an Old Woman in the Neighbourhood, she advis'd him to swallow round white Pebbles, which he did as oft as he had occasion, and the Stones passing easily through him he found great Relief. But after some Months being seiz'd with a violent Fit, he swallow'd as usually about 9 Stones; which not passing he repeated the Dose till he had taken above 200. He had these Stones in him above 2 Years and a half, when he first came to me, and then complain'd, that his Appetite was gone, that he could Digest nothing, but threw up every thing he eat. Upon examining his Belly I found the Stones lay almost as low as the *Os Pubis*, and thrusting my Fingers just above that Bone, so that the lower part of the *Abdomen* might lie on my Hand, I could, with the Motion of my Hand, shake them and make them rattle as if they had been in a Bag. Hereupon I caus'd a Ladder to be set against a Wall, and hung him up by the the Hams upon it with his Head downwards; when in this Posture, he told me, the Stones were got up to his *Stomach*; but being set down upon his Feet, after a very small time, we could plainly hear the Stones drop distinctly one after another.

If his Body be not *Laxative*, he Vomits all he Eats or Drinks; to prevent which he commonly keeps it open with Whey. As he lies in Bed the Stones will

will sometimes get up (as he express'd it) almost to his *Heart*, and give him great Disturbance; at which times he is forced to get upon his *Knees*, or to stand upright, and then he can hear them drop, as is before mention'd; and at such times he can always count above an 100. He is so disabled by these *Stones* that he cannot work but in Pain, and then he finds the same Night and the next Day a great Soreness in the Bottom of his *Belly*, and Voids large Quantities of Blood by *Stool*. He has been under the Hands of several Quacks: Some had Vomitted him with *Stibium*, and Purg'd him; others Purg'd and Glister'd him; but all the forcing Medicines they made use of could never bring one Stone from him.

2. Some People (who see Birds Languish unless they swallow Gravel or small Stones) take up an Opinion, That the swallowing Stones helps the *Stomach* to Digest their Food. But I have been always against this Practice; Because though the *Stomachs* (or *Gizzards*) of Birds (they wanting Teeth to grind their Food) are made very strong, muscular, and defended in the inside with a Coat, by the help of which and these Stones their Victuals are ground; yet the *Stomachs* of Men being very different, 'tis not reasonable to think they should be of use to them. I knew one Mr. *Kinsmill*, who used to swallow for many Years (if I remember right) Nine at a time once every Day, without any injury; they were near as large as Walnuts, roundish, and smooth, and he found they always pass'd: But afterwards he dy'd suddenly.

Remarks on it;
by Dr. Sloan, M.D.
p. 192.

XVII. Sir *Fran. Butler's* Lady being surpriz'd with a large and painful Tumour of the *Umbilicus*, consulted Dr. *Eeles* and Mr. *Knowles* about it. After some time it broke of itself, and discharg'd a great Quantity of *Prune-Stones*; and notwithstanding all the Care could be taken of it, she dy'd in about 20 Days.

Prune-Stones
breaking out as
the Navel; by
Mr. Greenhill, n.
265. p. 617.

XVIII. A Servant to Sir *Anthony Keck* complain'd of a Pain and Hardness of his Right Side, which had continu'd more or less for 12 Years, and was observ'd to approach daily nearer the Skin. I made an Incision and pluck'd out a rusty broken Needle with my *Forceps*, which he thought he might have formerly swallow'd. It stuck in a manner so firm in the *Flesh* as if it had been fix'd in Wood, so that it could not be extracted without some Violence and a small *Hæmorrhage*.

A Rusty-Needle
breaking out at the
Side; by Mr.
Greenhill: B.

XIX. The *Glandulæ Miliæres* of the *Small-Guts*, which may also in some Animals be well call'd *Fragi-formes*, from the Figure of the one half of a Strawberry, I take to be *Excretive Glandules*, because *Conglomerate*.

The Glandulæ
Miliæres; by Dr.
M. Leister, n. 95.
p. 6062.

XX. Aug. 19. 1684. Mr. *Musgrave* took Notice, in the *Stomach* of a Jack, of a large Bed of *Glands*, making about $\frac{1}{3}$ of the inside of the *Stomach*, and seated near the *Pylorus*. The whole Bed appears of a Brownish-Red Colour, and is divided into several Ridges, which run parallel to one another, and the same way with the *Stomach*: For the better Contracti-

A Bed of Glands
in the Stomach of
a Jack; by Mr.
Musgrave, n. 162.
p. 699.

on

on of that Part, especially when empty; (at which time these *Glands*, being fix'd to the inmost Coat, are, together with it, drawn up into Wrinkles:) that Edge of this Bed of *Glands*, which is nearest the Head of the Fish, is dented, the Ridges breaking off on a sudden; but at the other end, a little on this side the *Pylorus*, they diminish almost insensibly. By these *Glands* he supposes at least a considerable share of the *Menstruum* (the great Efficacy of which makes this Fish a fit Subject to illustrate the Nature of *Digestion*) is separated from the Blood; for Blood-Vessels may be seen in great Numbers, on the other side of the *Glands*, and inner *Tunic*, by separating it and them from the Middle and Musculo-se *Tunic*: And, as a farther Argument of this Use of these *Glands*, he has observ'd, that that part of the *Stomach*, where they are, is generally Moister, than the other part near the Mouth; and that in Dissecting Jacks whose *Stomachs* have been fill'd with some large Fish of the Pinnaceous Kind (which must enter with the Head foremost) the Head and foremost parts of the devour'd Fish have, as far as the *Glands* reach, been either actually dissolv'd or fairly turning into a Mucilage; whereas at the same time the other, and less Bony part, of the included Fish, being not yet come within the power of the *Menstruum*, has still retain'd its Form and Consistence.

Explication of
the Figures.

Fig. 13.

Figure 13. Represents the inside of the *Stomach* of a Jack which was one Foot and 8 Inches long; the *Stomach* itself, about $8\frac{1}{2}$ Inches. *AAAA*, The Bed of *Glands*. *BBBB*, That part of the inward *Tunic*, which reaches from the Bed of *Glands* to the Mouth of the Fish: It appears much whiter than the *Glands*; the Fibres run the same way with the *Stomach*. *C*, The entrance into the Passage which leads to the *Bladder* of Air. *D*, The *Pylorus*. *E*, The Hollow of the *Stomach* continu'd beyond the *Pylorus*.

Fig. 14.

Figure 14. Represents the other side of the Bed of *Glands*, separated together with the inner from the middle *Tunic*, and great number of *Capillary* Vessels belonging to the *Glands*, but broken off in Separation.

Experiments con-
cerning Digestion
by Mr. Ch. Leigh.
n. 162. p. 694.

XXI. 1. I here give you an Account of an *Artificial Digester*, which I hope may something illustrate the Natural One. The Taste of it is like Meat Vomitted out of a full *Stomach*, something Sour, but will not Ferment with an *Alkali*. It is prepared from *Spirit of Sulphur*, *Spirit of Harts-Horn*, the *Chyle* of a Dog, and the *Saliva*; It is Pellucid, and without any Smell; the *Salt* that it shoots into is *Cubical*. Upon Veal it afforded these *Phænomena*; Into a *Dram* of this Liquor I put a piece of Veal about the bigness of a Nut, and set it upon a Digesting Furnace: In two Hours time there came from the Meat a Liquor that had the Colour and Taste of *Chyle*, and the Meat afterwards was Lighter, Dry, and Insipid. And it afforded the same *Phænomena* also in Beef, Mutton, or any other Meat that I could meet with. From these Observations we may reasonably conjecture, That by some such *Menstruum* the Meat is *Digested* in the *Stomach*.

I would not here be thought to affirm, That by a *Liquid Menstruum* alone the Meats are *Digested*, but that there are likewise requir'd these further Requisites, in some, or in most Creatures. 1. That the *Stomach* receive a gentle Heat from the *Liver*. 2. That the *Stomach* have a Natural Situation. 3. That it be assisted by the *Omentum*. This may be argu'd from those Creatures that have no *Caul*, helping *Concoction* by doubling their hinder Legs, by resting their Bellies upon them, as *Hares* and *Conies*. 4. That the *Stomach* have a *Tunica Villofa*; 1. Because that by that it is enabled to divide the Meat into Parcels, which undoubtedly must much facilitate the Operation of the Natural Ferment. 2. If it had not a *Tunica Villofa*, the *Tunica Carnosa* would be apt to be too much distended by our Meat and Drink, which would necessarily weaken the Tonical Motion of the *Stomach*. 5. That there be *Windings* of the *Intestines*; for if it were not for these, the *Digested* Meat would move too fast from the *Stomach*, and so Torment us with perpetual Hunger.

The *Ingredients* of the *Natural Ferment* I take to be these; The *Saliva*, the *Succus* of the *Glands* of the *Stomach*, and a *Nitro-Aerial Spirit* of the *Nerves*. That the *Saliva* is an *Ingredient*, may seem probable from these Reasons: 1. Because that by the Help of this, Meats, tho' impregnated with different Principles may be made to mix with a *Menstruum*. 2. Since the *Saliva* is impregnated with a Volatile Salt, it is probable, that that too may help *Digestion*. The Second *Ingredient*, I take to be a *Liquor* that is separated by the *Glands* in the Bottom of the *Stomach*: For, besides the Authority of the Famous *Willis*, and *Sylvius de le Boe*, it is observ'd, That those Creatures which have the most of these *Glands*, are the most Voracious. Lastly, That the *Nitro-Aerial Spirits* of the *Nerves* are an *Ingredient* of the *Stomachical Ferment*, seems reasonable from the Arguments of Dr. *Mayow*, who argues thus: *Fam vero cum Spiritus Animales à particulis Nitro-Aeris constant, haud difficile erit intellectu quomodo Effectus prædicti ab iisdem in Ventriculo perficiuntur. Quanquam enim Spiritus Nitro-Aerius Acidus non est, ab eodem tamen Ferrum corroditur, Vitriola perficiuntur, Salia Fixa ad Fluorem perducuntur, Rerumque Compages tanquam ab Universali Menstruo solvuntur.*

Pharm. Ration
p. 6.

Sylv. de le Boe
p. 881.

Mayow. p. 55.

2. Aug. 19. 1684, Part of a Mucous Substance taken out of the *Stomach* of a Jack, near the *Pylorus*, and mix'd with *Solution of Sublimate*, became much Whiter than it was before. Another Part of it mix'd with *Syrup of Violets*, turn'd Green.

By Mr. Muf
grave. n. 162.
p. 699.

The like Effects were observ'd by mixing a *Liquor*, found in the *Stomach* of a Hedge-Hog, with *Syrup of Violets*, and with *Solution of Sublimate*.

These Experiments may be urg'd as an Argument against the Existence of an *Acid Ferment* in the *Stomach*: It seems probable, that the great Work of *Digestion* proceeds from a *Volatile Alkali*.

XXII. It has been the Opinion of some Physicians, That the *Concoction* of the Food is a kind of *Elixation*, and that the Grosser and more Solid Parts being as it were boil'd in the Liquid by the Heat of the *Stomach*, and the Parts adjacent to it, as the *Liver*, *Spleen*, and *Omentum*, are by a long and

The manner of
Concoction; by
Dr. Clopton Ha-
vers. n. 254.
p. 233.

and continu'd *Elixation* first render'd more Tender, and then Colliquated and dissolv'd into minuter Particles, so as to mix more equally with the Fluid, and with that to make one Pulpament, or *Chylous Mass*. Others have suppos'd it to be perform'd by *Attrition*, as if the *Stomach*, by those repeated Motions which are the necessary Effects of Respiration, when it is distended by the Aliment, did both rub or grind off some minuter Particles from the Groffer Parts, and by continually Agitating the Mass of Food make those Parts, which are not contiguous to the *Stomach*, strike one against another, and break one another in pieces, until they are all Attenuated. Others think that the *Bilious Juice*, others, that the *Spirits*, are chiefly concern'd in this *Affair*. Others there are that will have the Food Dissolv'd by a *Menstruum*, which is supply'd from the *Glands* of the *Stomach*, or some other Way: But these differ in their Notions of the Nature of the *Menstruum*: For there are some that suppose it to be an *Acid*, which does Erode the Groffer Parts of the Food, and dissolves them in the same manner as *Vinegar*, *Spirit of Vitriol*, or any such-like *Acid*, will dissolve even so solid a Body as Iron. And it cannot be deny'd, but that *Oyl of Vitriol* will dissolve Flesh-meat, and reduce it to a Pulp. But it is not to be suppos'd, that the *Fibres* of the *Stomach* can admit any such strong and corroding *Acid*, without something to correct it, but it must be injur'd in its Tone, and labour under great and extraordinary Pains. Neither does such a *Menstruum*, tho' it will digest some Things, seem capable of Dissolving so great a Variety of Things as we eat, especially when a great many of them are of a contrary Nature. Some will have the *Menstruum* to be a *Nitro-Aereous Spirit*, that is Quick, and very Penetrating, and included in its proper Vehicle; which, being in its own Nature apt to Penetrate the Mass of the Aliment, does Diffuse itself throuh the whole, and breaking the *Vinculum* of the most solid Parts, does Dissolve their Compages. By others it is thought to be some *Saline-Juice* in the *Stomach*, by which the Parts of the Aliment are Divided and Dissolved, and those which are fit for Nourishment are Volatiliz'd. Lastly, There are some who suppose the *Digestion* of the Food to be perform'd by the Benefit of a *Ferment*, which, when it is mix'd with the Aliment, excites in the Mass an Intestine Motion, and the different and contrary Motions or Tendency of the Parts, making some kind of Collision, gradually break off Particles from the Groffer and more Solid Parts, till they are so Attenuated as to be apt to mix more equally with the Fluid, and with them to make one Soft, or *Chylous Substance*. But these also differ in their Opinion of this *Ferment*: For some think it to be the *Remains* of the Food that was last *Digested*, which having lain some time in the *Stomach*, after the rest is carry'd down into the *Intestines*, contracts an *Acid*, or some other Quality, and is so alter'd as to partake of the Nature of a *Leaven*. And this *Leaven* being a Part of the Food, which has been already *Digested*, is so Soft and Liquid as to be capable of mixing with the Aliment which is next taken into the *Stomach*, and being Agitated with it by the repeated Pressures of the *Diaphragm*, *Liver*, and *Abdominal Muscles*, upon the *Stomach* in Respiration, does diffuse itself through

through the whole Mass, and being mix'd with it like *Leaven*, or Yeast added to new Wort, &c. puts it into a State of *Fermentation*, and by this *Fermentation*, or the Expansion of the *Ferment*, and the more Tenuous Parts, which are first put into Motion by it, those which are more solid, and with which they are intermix'd, are Rent and Divided, and so Attenuated as to become a Soft and Pulpous Matter. And although the greatest Part of the Food, that is thus broken and concocted, is by the Contraction of the Fibres of the *Stomach* pressed into the *Duodenum*, yet they do not contract themselves so as to force out all the Aliment, but leave between the *Rugæ* or Folds on the inside of the *Stomach*, a sufficient Quantity to be a *Leaven* to the next Meal; and so from Time to Time. Some have a Notion, That this *Ferment*, or Principle of *Fermentation*, is in the Aliment itself; which being a Congeries of Matter, consisting of various Parts of a different Nature, is no sooner inclos'd in the *Stomach*, and digested in the Heat of that and the adjacent Parts, but the more Spirituous and subtle Particles are put into Motion, both from that Warmth and the Difference of their Natures, and enter upon a *Fermentation*: And so by their Intestine Commotion, and the Violence they offer to those Parts which oppose the Tendency of any of them, they break and Dissolve what is more Solid. Again, some suppose, That this *Ferment* is supply'd from the *Glands* of the *Stomach*. And lastly, Others, and perhaps with much better Reason, contend for the *Saliva*, and make that to be the *Ferment* which serves principally for the *Digestion* of the Food; which in *Mastication* being mix'd with our Aliment, is with that carry'd down into the *Stomach*, where the Parts of it being put into Motion by a kindly and agreeable Heat, they do *Ferment* with, and Exagitate first those Parts of the Food which are most apt to *Ferment* with it, then both conspire to break and Dissolve the Grosser and more Stubborn Parts.

But according to my *Hypothesis*, *Concoction* is perform'd after this manner: In order to the more easy and effectual *Digestion* of the Food, Nature has appointed some Parts for the Breaking our Aliment, and reducing whatever is gross into smaller Parts, before it is put upon *Digestion*: Others to supply the *Ferment* by which it is to be Dissolv'd and Concocted, and which, before it comes to be included in the *Stomach*, does moisten, and make it more soft, that it may more easily be penetrated and broken by those Parts which serve to divide every Morsel into smaller Pieces, and prevents the Inconvenience and trouble which would arise from the Nourishment sticking about or between them when it is Dry or Viscous.

For the Breaking of that Part of our Food, which is not liquid, Nature has furnish'd us with *Teeth*, and those of two Sorts: For some are ordain'd to divide and break off smaller Morsels from a larger Mass; others are made for the Grinding those Morsels into much smaller Parts. The *Teeth* which serve to break off Pieces of a convenient Magnitude from a larger Mass, are of two Sorts, accommodated to the Nature of the Substance which we eat. These are the *Incisores*, and the *Dentes Canini*. If the

Substance which we have to eat be not hard, but more easily Penetrated and divided, then the *Incisores* are capable of making an Impression upon it, and fix'd firmly enough in the *Jaw* to break off that Part which they take hold of. But if it be more Solid, and not easily Penetrated, nor any piece without Difficulty to be separated from that Body whereof it is a Part, then we apply the *Dentes Canini*, or *Eye-Teeth*, to it, which are not spread, nor have such an Edge as the *Incisores*, but are sharp and pointed like an Awl, and so do more readily Penetrate a Substance that is hard, and which the *Incisores* can scarcely make any Impression upon. And as the Parts of a more Solid Body are commonly with more Difficulty separated, and there must be a greater stress put upon those *Teeth* which pull it into Pieces; so these *Teeth* are much more firmly fix'd in the *Jaws* than the *Incisores*, tho' they have but one single Root. Besides, the Position of all these *Teeth* is accommodated to their Use, as being planted opposite to the Aperture of the Mouth, so that they may be conveniently apply'd to the Substance which we have to Eat before it is Broken, and when it is too large to be admitted within the Mouth. The *Teeth* which do by a Compression and Attrition reduce the little Morfels to smaller parts, are, from the manner in which they break the Aliment, called *Dentes Molares*, because they do, like so many little Mill-stones, Grind the Food between them. And that they might be render'd fit for this Purpose, they are made Broad at that Extremity which stands out of the *Gums*, by which means they retain some Quantity of the Food between them every Time the *Lower-Jaw* is pull'd up and forc'd against the *Maxilla Superior*. And as they are Broad, so they are form'd with Inequalities, and Protuberances, and by the Motion of the *Lower-Jaw*, from one side towards the other, they Grind what they have between them into Pieces. The Position of these *Teeth* too is as convenient as that of the *Incisores*, and the *Dentes Canini*: For being design'd to break those Pieces of our solid Food which are taken into the Mouth, and these Pieces when they are compressed and moved by the *Dentes Molares* being apt to fly out of the Mouth if there were no Contrivance to prevent it, they are placed beyond the Aperture of the Mouth, and opposite to the Cheeks, which keep the Food within that Cavity; and not only so, but Press it in between the *Dentes Molares* on one side, as the Tongue does on the other, until they have sufficiently Broken and Divided it.

At the same time, whilst the *Dentes Molares* are breaking the Food, there flows into the Mouth a *Salival-Juice* which mixes with it, and not only serves to moisten it, and to render it more apt and easy to be divided, but seems to be the *Ferment*, by the Benefit of which the Food is dissolved and digested: And therefore it is intimately mix'd with it by the *Teeth* agitating or stirring them together in *Mastication*. This Liquor, which we commonly call the *Saliva*, or Spittle, seems to be a Composition made of twoseveral Juices, very different in their Nature. And therefore the several Parts of it are separated by their proper *Glands*, and Nature has planted no fewer than 4 Pair about the Mouth, which supply the Juices that make the *Saliva*; to wit, the *Barotides*, and the *Glandulae Nuckiana*,
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the *Glandulae Maxillares Internae*, and *Sublinguales*. Of these two Juices, I think one to be an *Acid*, the other an *Oleaginous Liquor* something like *Oyl of Turpentine*. For amongst many Experiments this gave me most Satisfaction; I took a piece of Raw Flesh, and having cut it into Pieces but much larger than what our more Solid Food is reduc'd too by due *Ma-*
stication, I mix'd some Crumbs of Bread with it, then I pour'd in *Oyl of Turpentine* to them, and upon that *Oyl of Vitriol*, and having shaken them together, I digested them about 4 Hours in *Balneo Mariae*, and then shaking them again in the Glafs, I found the Meat dissolv'd, and they all became a thickish Pulp. I could not but take Notice, that *Oyl of Cam-*
phire (tho' it does not otherwise seem much different in its Nature from *Oyl of Turpentine*) and *Oyl of Vitriol*, which upon Mixture will produce an Effervescence as well as the *Oyl of Turpentine* and *Oyl of Vitriol*, yet did not touch the Meat upon which I pour'd them, so as in the least to dissolve them. I cannot deny, but that an *Acid* and a Solution of *Salt of Tartar* did dissolve some part of the Flesh Meat, which I mix'd them with, but yet neither so soon nor so perfectly as the two foremention'd *Oyls*. And I do the rather think one of those Juices, which constitute the *Saliva*, to be of the Nature of *Oyl of Turpentine* than of *Fix'd Salt*, because it will correct and temper even *Oyl of Vitriol*, so as to render it more tolerable to the Fibres of the *Stomach*. Not that I suppose the *Acid* Part of the *Saliva* to come near to the Acidity of *Oyl of Vitriol*: For tho' when they are mix'd, they will make a Liquor that may not be injurious to the *Stomach*, yet the *Acid Juice*, if it were so Corrosive as *Oyl of Vitriol*, would certainly be injurious and painful to the *Salivatory Ducts*, which convey it to the Mouth before it is mix'd with the *Oleaginous Liquor*. But I only say, it is an *Acid*, and in some degree approaches to the Nature of that *Oyl*.

I do also conceive, that 4 of the 8 *Salivatory Glands*, or two Pair of the 4, do supply one of these Juices, and the other 4 *Glands*, the other. And this seems to be a very good Reason, why they are so planted, and the Orifice of their *Ducts* so order'd, That the Juice which is supply'd by one *Gland*, is discharg'd into the Mouth very near to the Orifice by which the Juice of a different Nature is transmitted from another, so that they must necessarily meet and mix together. Thus the *Glandulae Nuckianae* and the *Parotides* throw in two different Juices by Orifices which open into the Mouth very near to one another, and the *Glandulae Maxillares Internae* and *Sublinguales* do below supply the same kind of Juices by Orifices, that open so near to one another as to secure the Mixture of the two different Juices. These *Glands*, I say, do between them afford two divers sorts of Liquors, of such a Nature as are apt to *Ferment* upon their first Mixture, but perhaps more considerably when they come to be digested by the Heat of the *Stomach*. So that the Colluctation, or *Fermentation*, which Attenuates and Concocts the Food in the *Stomach*, does not ordinarily arise between the *Aliment* and the *Saliva*, but between the several Parts of the *Saliva* itself. And indeed if the *Saliva* did not consist of two Juices whose Nature is in such a manner different, as to render them apt to *Ferment* upon their Mixture, it would be very hard to conceive how it should so readily
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and indifferently serve for the *Digestion* of all Eatables; how it should Ferment with, and Dissolve so great a Variety of Things not only of a Different, but of a Contrary Nature; how it should Ferment with *Acids* as well as *Alkalies*; Digest Things that are Cold as well as Hot or Temperate; some Things that are Salt, others that are Insipid; Bitter, and Sweet; Mucilaginous, Oily, &c. But if we suppose that the *Fermentation* which serves for the Digestion of the Food, arises from a peculiar Difference in the Nature of two Juices which constitute the *Saliva*, it will be easy to give a rational Account of our *Concoction* of innumerable Things of a different Nature. And this seems to be as effectual, and a more certain Way to Attenuate and Dissolve the grosser Parts of our Food, than if the *Fermentation* were made only between the *Saliva* and the *Aliment*: Besides the *Saliva* seems to discover a *Fermentation* upon the Mixture of its constituent Juices, even at those Times when we do not actually Eat; for it is always attended with Bubbles, and a Froth, when it has not been at all agitated in the Mouth, and many of those Bubbles will remain for some considerable Time after we have spit it out.

Nature therefore having appointed the *Saliva* for the *Digestion* of the Food, has taken Care that it shall be thrown in upon the *Aliment* on every Side. Thus the *Glandulae Nuckianae* and the *Parotides* supply their Juices to that Part of the Food which lies on the outside of the Gums; between the Cheeks and the Teeth, and the *Glandulae Maxillares Internae* and *Sublinguales* do bestow their Liquor upon the Meat which is within the Teeth and Gums. She hath also had a Regard to the Mixture of the two different Juices of the *Saliva*, which is necessary to its *Fermentation*: And therefore, as I have already observ'd, the Orifices of the *Ducts* which belong to one Sort of *Glands*, are plac'd near the Aperture of a *Duct* which conveys a Juice from one of the other *Glands*. So the *Ducts* of the *Glandulae Nuckianae* and the *Ductus Stenoniani* do on each Side open into the Mouth near one another; and the *Salivatory Ducts* of the *Glandulae Sublinguales* and the *Maxillares Internae*, tho' they have distinct Orifices, empty themselves under the same *Papillae*; and the Juices, which are supply'd by them, meet there and flow into the Mouth together. The *Saliva* being thus mix'd, and beginning a *Fermentation*, does partly as it is agitated with the Food by the Teeth and some other Parts of the Mouth, partly by its own Fluidity, insinuate itself into, and mixes with the Food, and not only moistens and Softens it, but excites the *Fermentation* which is to dissolve it. And when the *Aliment* is thus mix'd with the *Saliva*, which serves to Ferment the whole Mass, it is then convey'd into the Stomach, that great Digestive Vessel of the Body, where it is kept in a *Digestive Heat*, and the *Fermentation* not only Continued but Improv'd. This *Fermentation* in the Stomach first agitates the more Tenuous or Subtile Parts of the Food, and puts them into Motion, and so with the *Fermentation* of its own, and those Alimentary Parts which it first communicates a Motion to, improv'd by the Heat of the Stomach, the *Saliva* must necessarily Act upon the grosser Parts. For the *Intestine Motion* which is excited in the Mass, does not give the Particles

ricles which are Fermented the same Tendency, but what is so various and confus'd that they must inevitably strike not only one against another, but against those which are more gross, so as to Attenuate them, sometimes by a Collision, which strikes off smaller Particles from the larger Parts; sometimes by a Compression, when the Particles, which are in Motion, happen to strike directly against any grosser Part on every Side of it; sometimes by a kind of Explosion. For without doubt the *Saliva*, which is Fluid, insinuates itself into the *Interstices* of the more Crass Parts of the *Aliment*, and whatever is agitated or expanded in those *Interstices*, requiring a larger Space for the Freedom of its Motion, and offering a Violence to every Thing that opposes its Tendency, will, like Gunpowder included in a Shell, force its way out, and tear to pieces that Matter which does endeavour to confine it. Thus the grosser Parts are broken and divided, until they are at last so far Attenuated as to mix more equally with the Fluid, and with them to make one Pulp or *Chylous* Mass. And altho' I do not apprehend how the Stomach should, by its reciprocal Motions, in Inspiration and Expiration, be able to break and attenuate any Matter that will not be softned and dissolv'd by Agitation in a Liquid, yet it is certain that these Motions, caus'd by the *Diaphragme* and *Abdominal Muscles* in Respiration, do make those Parts which are broken off, as they are dissolv'd, mix more intimately with the Liquid, as the Meat, which I digested with Oyl of Turpentine and Oyl of Vitriol, did, by Agitation, mix more equally with the Oils, and became a Pulpament:

It is further probable, That from the Mixture of the two Juices of the *Saliva* and their Fermentation, there results such a *Tertium quid* as is apt to ferment with the *Bile*. And therefore when the *Aliment* has been under the *Fermentation*, excited by the *Saliva*, a sufficient Time, it is then thrown into the *Duodenum*, where it meets with the *Bilious Juice* which flows into that Intestine from the *Liver*, from which a new *Fermentation* seems to begin; and the Commotion of the Parts of the *Aliment* being still continu'd, does carry on the Business of *Digestion*, until the Food is perfectly concocted. Tho' it is probable, That this new *Fermentation* serves not only for the more perfect *Digestion* of the Food, but likewise for the Separation of the *Chyle* from the *Fæculent* Parts. And I was confirm'd in the Opinion, That from this Mixture and Fermentation of the two Juices, which constitute the *Saliva*, there results a Matter which is apt to ferment with the *Bile*, by this Experiment; The *Bile* being generally allow'd to have much of a *Saponary* Nature, I made a Solution of Soap in Fair Water, and mix'd it with the Oyls of Turpentine and Vitriol first put together, and from their Mixture, I observ'd a very easy and gentle *Fermentation*, which continu'd for a considerable Time.

XXIII. 1. It hath been long in my Thoughts and Desires to have discover'd the Actual Passage of the *Chyle* into the *Lacteous Veins*; of which yet I never doubted, as I find some do at this Day. The Difficulty lies in the certain and unalterable Character of the *Chyle's Whiteness*, especially when receiv'd

The Colour of the
Chyle in the Lacteous
Veins; by
Dr. M. Lybber, n.
95. p. 6060.

receiv'd into those *Veins*. And yet it is certain, that in a *Diabetes* the Urine retains all the Qualities of the Liquor Drunk. Also in that famous Instance of those that eat the Fruit call'd the *Prickle-Pear* (if I remember aright,) their Urine hath affrighted the Eater with the Colour of Blood, that is with the not-alter'd Colour of the Juice of the Fruit. In these Instances, at least, we cannot doubt but the *Chyle*, even in the *Lacteous Veins*, was qualified according to the Food and Drink.

To effect then something to this purpose, we laced the Skin of the *Abdomen* of a Dog loosely for a Hand's breadth, and then opening it underneath the Stitches, we took out either the *Duodenum*, or any other Part of the *Tenuia Intestina*. The Gut took out we open'd with a very small Orifice, and having ready a ting'd Liquor luke-warm, we injected it upward and downward: Carefully stitching up the Gut, and then drawing the Lace, we unloosed two of the Dog's Feet, laying him on his Side for what Time we thought convenient. The Ting'd Liquors we used, were good *Barbadoes Indigo* dissolv'd in fair Water, and filtrated; also Lumps of *Indigo* thrust down his Throat; good Broth (as they call it) of a Blew Fat; *Indigo* in Milk; *Saffron* in Milk. Again, we try'd in some Dog's Fed before-hand, and Injected the Liquors in the very height of the *Chyle's* Distribution; into others yet Fasting, and that for a longer or shorter Time. The Success was so constant, that we cannot say we ever did find the least discolouring of the *Chyle* on the other side the *Guts*, that is within the *Lacteous Veins*, but ever White and Uniform.

N. 143. p. 6.

But the Success of some latter Experiments was as follows; I caus'd a Dog to be Fed, and after 4 Hours, or thereabouts, having ready by me a clear Tincture of *Indigo* dissolv'd in fair Water and Filtred, I open'd the *Abdomen*, and making a small Incision in the *Jejunum* I injected an Ounce or two. This done, we Stich'd up the Gut and all again, and the Dog turn'd upon his Legs. After one Hour and a quarter we cut the Stitches, and then beheld a copious Distribution of *Chyle* and Turgid *Lacteal Veins*; but as White as ever. And yet carefully searching the *Guts*, we perceiv'd none of the Injected Liquor any where. Another Dog, which was kept Fasting 40 Hours, had a very little Flesh without Water given him about 5 Hours before the Injection of the Tincture of *Indigo*; which was perform'd after the same manner as before; only it was now well warmed, and about 12 Ounces thrown up the *Duodenum*, and down the *Ileum*. Here were empty *Guts* and not the least Appearance of any *Lacteal Veins* in the *Mesentery*; After full 3 Hours the Stitches were cut again, and carefully examining the *Mesentery* we found many *Lacteal Veins* of an *Azure* Colour, and cutting some of the biggest of them asunder, we plainly saw a thick *Blewish Chyle* to issue forth, and to spread itself over the transparent Membranes of the *Mesentery*. Hence it is most evident, that the *Lacteal Veins* receive what they carry from within the Cavity of the *Intestines*.

The Lacteals frequently convey Liqueurs that are not White, by Dr. Will. Mufgrave. N. 166. p. 812.

2. I have found Dr. Lister's Experiment to succeed, by injecting a Pint of a Decoction of Stone Blew, into one of the *Intestina Tenuia* of a Dog kept Fasting 36 Hours; which not only claim'd my Assent to his Conclusion,

sion, that a Colour'd Liquor may find Admittance into the *Lacteal Vessels*, but also inclin'd me to an Opinion, That the *Lacteals* frequently convey Liquors which are not *White*. And I am more confirm'd in this Opinion by Experiments of these three Kinds.

1. I kept 2 Dogs Fasting, one 48 Hours, the other 3 Days, and then open'd them; in both a considerable Number (above 20 were fewest) of the *Lacteals* appear'd *Pellucid*, like *Lymphaticks*; only not so full and turgid as those under the *Liver* are generally, or as the *Lacteals* themselves are sometimes seen: I cut several of them in each Dissection, and immediately a *Transparent* Liquor flow'd out of the Orifice.

2. A Dog, which had neither Eaten nor Drunk in 3 Days, was suffer'd to Lap a Quart of common Water; an Hour after which he was open'd, the *Lacteals* shew'd themselves in a great Number (perhaps above 60) all *Limpid*, from the Liquor contain'd in them, as in the former Experiments: Part of the Water was suppos'd to be still in the *Stomach* and small *Guts*; for the quantity of Water seen there, was far greater than that in the *Prima via* of either of the Dogs kill'd Fasting.

3. Another Dog, after three Days Fasting, had a piece of Fat Meat given him; an Hour and half after which, he lapt about a Quart of common Water, and half an Hour after this, was open'd: I first ty'd the *Ductus Thoracicus*; then examin'd the *Lacteals*; which I saw in as plentiful a Number, and as full as (perhaps) they were ever seen in this Species of Animals; 8 or 10 of them, at the first opening of the Dog, appeared perfectly *White*, very many of a faint diluted *White*; but most of them were *Pellucid*, especially at the latter end of the Dissection; by which time several, which at first were either of a Lively, or of a Fading *White*, were now grown *Transparent*. That I might satisfy myself as to this Difference in the Colour of these Vessels; I opened the *Intestinum Jejunum* and *Ileon* in several Places, and found the Water was got as far as the *Caecum*, and had carry'd down divers little parcels of the Meat with it; by which means the Liquor seen in the *Lacteals*, at the first view of them, was either of a Perfect or of a Diluted *White*, or else *Pellucid*, according to the Mixture of the Meat with the Water in the *Guts*.

I order'd about 3 Pints of Broath to be given a Dog, which had been kept Fasting 24 Hours; and opening him 4 Hours after this, I observ'd the *Lacteals*, beginning at the *Duodenum*, (which, with the other small *Guts* and *Stomach* was very much distended with the matter of the last Meal:) all the *Lacteals* that I saw at first were of a perfect *White* Colour; several of which I prest between my Fingers, drawing them from the Circumference toward the Center of the *Mesentery*, by which Means I found, that the *Chyle* contain'd in these Vessels appear'd *White*, when it ran in a shallow stream as well as when it fill'd the *Lacteals*. Viewing the rest of these Vessels along toward the *Caecum* I observ'd, that near the middle of the *Intestinum Ileum*, they began to be of a more Diluted *White*, and a little farther, they were really *Pellucid*, and as Turgid, to appearance, as those that were *White*; after which turning back again toward the *Stomach*, I saw

saw the same Vessels (I think) in as great Numbers as at first (perhaps above 80) but the Colour of most of them was chang'd, for they were all now *Pellucid*: Some 3, or 4, which I at first cut asunder for my better Inquiry into the *White Chyle* contain'd in them at that time, being *Limpid* together with the rest. The same thing succeeded in a Dog kept Fasting 2 Days, and then open'd 3 Hours after he had Lap'd 3 Pints of Milk, part of which was seen in the *Stomach* of the Dog; about 15 of the *Lacteals*, arising from the *Duodenum*, were *White*; above 100, proceeding from the *Intestinum Jejunum*, and *Ileon*, were more or less *Transparent*; as also were those of the *Duodenum* at the latter end of the Operation.

The Experiments of the 1st kind do sufficiently prove, that the *Lacteals* convey not only *Chyle* (which results from *Aliments* lately taken into the *Stomach*, and may be call'd *Liquor Novitius*) but also another Humour separated (as is most probable) from the Blood, and now returning to it again; which (by means of the aforesaid Experiments,) may be seen purely by itself, without any Mixture of *Chyle* with it. And it seems not unreasonable to derive this *Liquor Refluus*, or at least Part of it, from the Hollow of the *Intestines*; if we consider that the *Pancreas*, and *Glandularum Plexus Fragiformes*, (not to mention the *Liver*) do daily discharge a Liquor into the *Intestines*; which (considering that Dogs, after 3 Days Fasting, will, as I have often observ'd, have very hard *Feces* in their *Intestine Recta*) we cannot well dispose any of other Way, than by saying, it re-enters the Blood by the *Lacteals*, and is that very Liquor which conduces to the making some of them appear *Transparent* after so long a Fast. It seems also probable from the same Experiments, that the *Lacteals* are very seldom, or never, all empty at the same time; for tho' the *Chyle* flows only in certain Tides, or Flashes, *pro ratione Ingestorum*, yet the *Liquor Refluus*, running in a more constant Stream, does, when there is no Flash of *Chyle* going in, keep the *Lacteals* from being absolutely empty. And 'tis farther evident, that this *Liquor Refluus* is in its own Nature, *Transparent*, and passes such through the *Lacteals*, after long Fasting, when no *Chyle* is mix'd with it; which is no inconsiderable Step to the making out of my Proposition, if we recount how long, and how often, very many Quadrupeds, besides Men, do Fast from all Sort of *Aliment*; during which Time, after the *Chyle* of the last Meal, or time of Drinking, is all mix'd with the Blood, we may suppose, that this *Pellucid Liquor Refluus*, goes alone into the *Lacteals*.

The Experiments both of the 2d and 3d Kind, seem to intimate, that a great Part of the *Chyle* itself is, in its Journey through the *Lacteals*, altogether *Limpid*. Against which it may be objected, That some of the *Lacteals* were in a like manner *Pellucid* in all the Experiments of all the 3 Kinds, and therefore it does not appear but that they may be fill'd with a *Liquor Refluus* in the 2 last Cases, as well as (for certain) they were in the first Case. To this Objection, beside what may be answer'd from the Extraordinary Number, and Fulness of the *Limpid Lacteals* in the two last Kinds of Experiments, comparing these Vessels with those of the same sort

fort seen in the first kind (which comparative Excess cannot be imputed to any Cause so reasonably, as to the Matter given the Dogs a little before the Dissection of the two last kinds;) besides this, I say, it may farther be reply'd, That in all the Instances of the 2d and 3d Cases, a considerable Quantity of Aliment was taken in by each Dog, not long before his Death; that some of this Matter was seen in the *Prima Viæ* of every one of them when dead, (an Argument it was not all distributed;) That there is no Way certainly known, by which Liquors are discharg'd the *Prima Viæ*, in this Species of Animals, besides Vomiting, Siege, and by the *Lacteals*; and that, seeing neither of the two former took place, it may not be unreasonable to suppose, that Part of this Matter was, at each Dissection, in its Way thro' the *Lacteals* to the Blood, all the Operations being at such Distances from the time of the Matter's being taken in, at which most Liquid Aliments are observ'd to swell up the *Lacteals*.

If therefore the Liquor, seen in the *Pellucid Lacteals* of the 2 last kinds of Experiments, did in a great Measure (for I by no means exclude the *Liquor Refluus*) consist of the Matter lately taken in before the Dogs were open'd, we may with good Reason imagine, that Water drunk on an empty *Stomach*, (as it was in the 2d Case) by several other Quadrupeds, and Men as well as Dogs, will pass the *Lacteals*, not under a *White* Colour, but rather *Pellucid*; and these Cases are not uncommon amongst us; particularly this seems to hold true in those who drink great Quantities of Diuretick Mineral Waters, in the Morning Fasting; of which suppose any Person takes and evacuates 3 Quarts by Urine, in the Forenoon; and with his Dinner, and in the Afternoon, drinks 3 Pints of Beer, or the like (allowing that all the *Chyle* produc'd from what he takes in at Dinner, and in the Afternoon, amounts to 2 Quarts, and that these 2 Quarts of *Chyle* are perfectly *White*; which in all Probability is not true; yet I say, according to this favourable Account) 3 Pints of *Pellucid*, for 2 of *White Chyle* will pass the *Lacteals* in this Person in 24 Hours. And what is here said of Water, is not unlikely to be true (*mutatis mutandis*) of several other Liquors, as Wine, Beer, &c. at least so far as that they may not pass *White* thro' the *Lacteals*, which is sufficient for my Purpose. Again, if this Principle be true, the 3d kind of these Experiments will go yet farther, and argue, That the whole Quantity of *Chyle*, arising from some Sorts of Meat and Drink, taken either at, or near, the same Time; or from some sort of Meats taken alone; is not always *White*; for the *Lacteals* which appear'd perfectly *White* in the several Instances of the 3d kind, were far inferior in Number to those that were *Pellucid* in the same Dissections.

From these Premises, there appears some Reason to think, that the *Lacteals* frequently convey Liquors which are not *White*; and that *Chyle* may (not improperly) be divided into 3 sorts at least, viz. *White*, *Pellucid*, and *Intermediate* to these; contrary to the Opinion of those *Anatomists*, who thought it to be always *White*, as that Word is contradistinguish'd to *Pellucid*; altho' by *Chyle* they understood (as I likewise do) the Effects of Drink, as well as Meat, Concocted.

The Distribution
of the Chyle; by
Dr. Lister. n. 149.
p. 242.

XXIV. It seems probable, 1. That in the *Digestion* of Meat in the *Stomach*, there is made a Separation or Solution of *Urinous Salts*, no otherwise than in the rotting of Plants or Animals. 2. That the *Chyle* is highly impregnated with this *Urinous Salt*. 3. That the *Whiteness* of the *Chyle* is from the *Fermentation* it has from its Mixture with *Urinous Salts*, and that if Diluted with fair Water, it is wholly depriv'd of that Colour, the *Fermentation* ceasing. 4. That the Salt *Chyle* is convey'd into the Venal Blood, and with it enters the *Heart*; and is thence thrown out again *Chyle*, as it comes in, by a continual Pulsation, into the Arteries. 5. That as oft as it enters the *Emulgent Arteries*, it there leaves behind it Part of its Salinous Liquor or Urine, and consequently abates of its Colour. 6. That when sufficiently freed of its *Urinous Salt*, it becomes a *Lympha*; which we think nothing else, but the residue of the *Chyle*, not yet made into the Nature of Blood, as not sufficiently depurated of its Saline Particles. 7. That probably it Circulates long under the Nature of a *Lympha*, often visiting all the Parts of the Body by the Arteries, and returning again to the *Heart*, partly by its own Vessels, and partly by the Veins. 8. That in Defect of *Chyle*; (for we cannot constantly Feed) Nature continually supplies the Mass of Blood with the *Lympha*, or Old *Chyle*. 9. That upon every Supply of Fresh *Chyle*, much of the old Stock or *Lympha* is (according to the Necessity of Parts converted into this or that Use, and not till then. 10. That there is ever more *Lympha* in the Mass of Blood, than there is need for the Diluting of it. The Arterial Blood (be the Animal never so much exhausted by Hunger) always parting with some, upon Extravasation and Coagulation. 11. In the Coagulation of Extravasated Blood, there is no Precipitation of Parts, as in Curdled Milk, &c. For if the *Chyle* be freshly distributed into the Mass of Blood, it will again separate itself as Oyl will from Water; and in like manner it is with the *Lympha* or Old *Chyle*, neither of them being as yet any essential Part of the Blood. 12. The Venal and Arterial Blood have probably both a like Quantity of *Lympha* to Dilute them; but the Arterial in Coagulating involves within its *Craffamentum* more than the Venal: The Reason may be, for that the Arterial is fuller of Air, which rarifies and renders the Arterial *Craffamentum* more Porous and Capacious of Lodging the *Lympha*; which yet as it subsides by long standing, parts with more and more *Lympha* daily. 13. The great Instrument of the Circulation of the Blood, is the *Systole* or Vibration of the Heart, which yet would not be sufficient for hindering the Coagulation of the Blood, without a continual Supply of the *Lympha* to Dilute it.

Chylification;
by Mr. William
Cowper. n. 220.
p. 231.

XXV. In the Reception of the Aliment, whose Grossness of Parts requires *Mastication*, the *Dentes Incisori* are for the most part employ'd to divide it from the more bulky Part. When a proportionable Piece is thus taken into the Mouth, the Lower-Jaw is variously mov'd by its proper Muscles, and *Mastication* is begun and carry'd on by the Assistance of the *Tongue*, *Cheeks* and *Lips*; the two first still applying the less divided Parts of the Aliment,

ment, to the *Dentes Molares*, till there's an equal Comminution of all its parts. At the same time divers of the Muscles, employ'd in the Motion of the Lower-Jaw, are also serviceable, in hastening the *Saliva* or Spittle separated from the Blood by the *Parotid Glands*; those of the Lower-Jaw and under the Tongue into the Mouth; the *Salival Glands* of the Cheeks and Lips also contributing their Juices; do all together joyn with the *Masticated Aliment*, before or at the same time it's made fit to be Swallowed; which Action is call'd *Deglutition*, and is thus perform'd.

The Aliment, as well what's Fluid as that *Masticated*, being lodg'd on the Tongue, which does somewhat hollow itself, by means of its own proper Muscular Fibres, for the more commodious entertaining the larger Quantity, its Tip and Sides are apply'd to the insides of all the Teeth of the Upper-Jaw, (and *Gingivæ* or Gums of those who want Teeth) the Tongue is suddenly drawn up by the *Musculi Styloglossi* and *Myloglossus*, together with those Muscles which pull the *Os Hyoides* upwards; at the same time the *Fauces* are also drawn up, and their Cavity enlarg'd by the *Musculi Stylopharyngei*; and about two thirds of the Tongue's superior Surface is adequately apply'd to the Roof of the Mouth; the *Epiglottis*, from its Position being consequently depressed, does thereby cover the *Glottis* or *Rimula* of the *Larynx*, and prevents any Part of the Aliment from Descending into the Wind-pipe. In this part of the Action of *Deglutition*, the *Glands* under the Tongue, and the *Excretory Ducts* of those of the Lower Jaw, are compress'd, and their separated Liquors or Spittle voided by their *Papillæ*, situated at the lower-part of the *Frænum* or Ligament of the Tongue; and this is done by the *Musculus Mylohyoides*. When the Aliment is thus forc'd into the *Fauces* or upper-part of the *Gula*, at the same time the *Gargareon*, together with the *Uvula*, are drawn upwards and backwards by the *Musculi Sphænostaphyli*; by which means any Part of the Aliment is hindred from Ascending into the *Foramina Narium*; and the *Fauces* by the *Musculus Pterygopharyngeus* and *Oesophageus*, are contracted; whereby the Aliment is not only compress'd into the *Gula*, but the Matter separated from the Blood by the *Glands* of the *Fauces*, especially of those large ones call'd *Tonsillæ*, is forc'd out of their Cells or *Excretory Ducts* to joyn with it in its Descent to the Stomach by the *Gula*, through which latter it passes, by the Action of its *Muscular Fibres*. Myot. Ref. p. 76.

The Aliment thus Impregnated with *Saliva* in *Mastication* and *Deglutition*, being received into the *Stomach*, there, meets with a Juice separated from the Blood by the *Glands* of that Part, whose *Excretory Ducts* open into the Cavity of the *Stomach*. By the Commixture of these Liquors, whether of *Saliva* or Juice of the *Stomach*, a proper *Menstruum* is composed, by which the Parts of the Aliment are still more and more Divided by its insinuating into their Pores, by which the Air before imprison'd in their less divided Parts, is not only set more at Liberty, but by the Natural Heat, it must necessarily suffer such a Rarefaction, as that thereby the whole *Stomach* becomes still more and more Distended; Hence it is that we have less Appetite some time after Eating (when this Intumescency is made) than we

Myot. Ref. In-
troduct. p. 12.

had immediately after; Hence also arise those frequent Eructations from divers Aliments, as old Pease, Cabbage, and divers other Vegetable, we frequently eat; All which become very much disturbing in Deprav'd Appetites and Weak Stomachs. At the same time when this Intumescence and Agitation of the Matter is made in the *Stomach*, the Contents of the Neighbouring *Excretory Ductus's*, namely the *Bile* in the *Gall-Bladder*, and *Liver Ducts*, and *Pancreatick Juice* in the *Ductus Pancreaticus* are compressed into the *Intestinum Duodenum*, through the Extension of the *Stomach* itself; the Refluent Blood of the *Stomach*, at that Instant, being, in some Measure, retarded, whereby the *Muscular Fibres* are more liable to be Contracted. Nor can we conceive how the Liquor of the *Stomach*, after having joyned with the *Saliva* and Aliment, should be still so plentifully Excreted from the *Glands* of that Part, as to Irritate its Internal Membrane, and excite its *Muscular Fibres* to Contract, since the Muscles of the *Abdomen* would, in like manner as in *Vomiting*, be drawn into a Consent of Co-operating, and the Aliment would be forcibly rejected by the Mouth: Besides, should the Liquor of the *Stomach* be so disturbing in *Chylification*, what would it be so soon as all its Contents were discharg'd. The Irritation the *Stomach* undergoes in Hunger, we are firmly perswaded does not arise but through an Accumulation of the *Saliva* in the *Stomach*, in Conjunction with the Liquor of the *Glands* of that Part; Hence it is we rather discharge the *Spittle* at that time by the Mouth, than to suffer any more of it to descend into the *Ventricle*; Hence proceeds what we call the *Watering of the Mouth*; Hence also, when the *Saliva* is vitiated, the Appetite is deprav'd. The *Stomach*, by means of its *Muscular Fibres* Contracting itself, does gradually discharge its Contents by the *Pylorus* into the *Duodenum*, in which *Gut*, after a small Semicircular Descent, it meets with the *Pancreatick Juice* and *Bile*; both which joining with it, renders some parts of the Aliment more Fluid, by still disuniting the grosser Parts from the more pure; and here *Chylification* is made perfect.

The *Bile*, which abounds with *Lixivial Salts* and apt to intangle with the grosser Parts of the Concocted Aliment, stimulates the *Guts*, and Deterges or Cleanses their Cavities of the Mucous Matter separated from the Blood by the *Glands* of the *Guts* and lodged in their Cavities; which not only moistens the insides of the *Guts*, but defends the Mouths of the *Lacteal Vessels* from being injured by Alien Bodies which often pass that way. The Contents of the *Intestines* moving still on by means of the *Peristaltick* or Worm-like Motion of the *Guts*, whilst those thinner Parts fitted for the Pores of the *Lacteal Vessels*, call'd *Chyle*, is absorbed by them; the thicker move still more slowly on, and by the many stops they continually meet with, by the *Connivent-Valves*, all the *Chyle* or thinner Parts are at length intirely Absorbed, the Remains being meerly *Excrementitious*, are only fit to be excluded by Stool.

The Analogous *White* appearance of the *Chyle*, whether in the *Stomach* or *Intestines*, and always in the *Venæ Lactææ* and *Thoracick Duct*, may be seen in the Commixtures of divers Liquids, which separated exhibit no such appearance,

appearance. Nor is this *Phænomenon* any otherwise than a Transposition of Particles whether by a *Menstruum's* insinuating into them, Dividing them into Gross Globules, as an *Acid* into a *Sulphur*, or Vinegar into Oyl, &c. or else by *Precipitation*, as when a Gummos or Resinous Body is dissolv'd in a Spirituous *Menstruum*, and mix'd with a *Pblegm*; so Tincture of *Myrrb* and *Benjamin*, &c. make a Milky Appearance in common Water.

The *Longitudinal* and *Transverse* Orders of Fibres of the *Guts*, are the Instruments by which the *Peristaltick* Motion of them is perform'd, which Motion is not only necessary for pushing their Concerns forwards; but by the reciprocal Contraction of those Muscular Fibres of the *Guts*, and Apposition of their *Connivent Valves*, the Mouth of the *Lacteals*, are dispos'd to receive what's fitted for them: Hence it is we can by no means make any Fluid whatever pass from the Cavity of the *Guts*, into those *Lacteal Vessels*, in a dead Animal. A further Use of these Contraction of the Muscular Fibres of the *Intestines* is to Accelerate the *Chyle* in its Progress in the *Lacteals*, till the *Lympha* deriv'd from the Extremities of the Arteries of the *Guts* joyns with it, which Conjunction is made in the *Lacteals*, before they leave the external Surface of the *Intestines*. By this Means the Progression of the *Chyle* is made towards the *Mesenterick Glands*, into whose Cells its receiv'd, where it again mixes with a Juice brought in by the Arteries of each *Gland*; which Juice or *Lymphatick Liquor*, not only farther Dilutes the *Chyle*, like that from the Arteries of the *Intestines*, but adds a fresh *Impetus*, by which its Motion is farther carry'd on thro' the *Vasa Lactea Secundigenis*, (arising out of each *Mesenterick Gland*, and discharging their Contents into the *Receptaculum Chyle*.) Here the *Chyle* meets and joyns with the *Lympha* sent thro' the *Lympha-Ducts* from the inferior Limbs and neighbouring Parts, whereby the *Chyle* is not only further prepar'd; but its Ascension is promoted in the *Thoracick-Ducts*, whose several Divisions and *Inosculation*s (like the Veins of the *Testicles*) with its many Valves looking from below upwards, and advantageous Situation between the great Artery and *Vertebræ* of the Back, together with the *Lympha-Ducts*, discharging their *Lympha* deriv'd from the Lungs and neighbouring Parts of the *Thorax*, does demonstrate the utmost Art still used in order to its Ascension towards the Left *Subclavian Vein*. Before the *Thoracick-Duct*, thus charg'd with the *Chyle* and *Lympha*, empties itself into the *Subclavian Vein*, it receives the *Lympha* brought from the superior Parts, all which joining, are soon discharg'd into the Left *Subclavian Vein*, where meeting with the Refluent Blood of the Superior Parts, passes with it through the Descending Trunk of the *Vena Cava*, and joins with the Refluent Blood of the Inferior Parts, in the Right *Auricle* of the *Heart*, whence it's expell'd by its Contraction into the Right *Ventricle*, when the *Heart* is in *Diastole*; but by the *Systole* or Contraction of the *Heart*, it's again driven out thence into the *Arteria Pulmonalis*, through whose Extremities, in Conjunction with those of the *Vena Pulmonalis*, it passes to the Left *Auricle* and *Ventricle* of the *Heart*, from whence 'tis again expell'd in the *Systole* (as above) in the *Aorto* or *Arteria Magna*, by whose Branches it's convey'd through the whole Field of the Body: The 3 *Tricuspid Valves* in the

the Right, and 2 *Nitral Valves* in the Left *Ventricle* of the *Heart* opposing its Return into the Veins, and the *Semilunary Valves* of *Arteria Pulmonalis* and *Aorta* preventing its Ingress into the *Ventricles* are sufficient (when rightly consider'd) to Demonstrate the Necessity of a Circulation of this Grand Fluid call'd *Blood*.

An Ill Digesti-
on by too much
Food; by M.
Christ. Kirby. n.
96. p. 6093.

XXVI. A Minister near *Dantzick*, about 50 Years Old, being much indisposed, and often relapsing into a Distemper accompanied with Vomiting and Purging, his Physician told me, he was persuaded, that his Cure was obstructed by the Patient's being oblig'd to Study: For when by the Help of the Medicines, prescrib'd to and used by him, he was brought to a considerable Degree of Recovery, his Studying and Preaching made him constantly Relapse. And to confirm this Conjecture concerning the Spirits being drawn away from the Stomach, and leaving the Digestive Power Languid, he added, That the Preacher one Day falling into a Relapse after a Sermon preached by him, and Vomits coming strongly upon him, he cast out, amongst other Matter, several Pieces, some as large as the End of a Man's Finger, some less, of a Substance, to the Touch and Eye perfectly resembling Tallow; 4 Pieces whereof weigh'd half an Ounce.

Four Men living
on Water without
Food 24 Days; by
..... n. 158.
p. 577.

XXVII. Some Colliers, working in a Coal-Pit at *Herstol*, about half a League from *Leige*, one of them in *Feb. 1683*. pierc'd a Vein of Water, which gushing in violently, Drowned one; those that were near the Mouth of the Pit were drawn out; but 4 of them, being further within, saved themselves upon a little Ascent within the Mine. 24 Days were spent in drawing off the Water, and the 25th, they were drawn out: I saw and examin'd them myself. They had not a Morsel of Bread with them, but liv'd on the Water of a little Fountain, which broke out by them; 2 Bottles of which I caus'd to be Evaporated, but found nothing but a scarce perceptible Calx remaining.

A Ruminating
Man; by Dr.
Fred. Slare. n.
193. p. 525.

XXVIII. Having heard of a Person at *Bristol* that did Eat his Meat twice, I procur'd the following Account of him, from Mr. *Day*, at that time Mayor of *Bristol*, in Answer to a Set of Questions I sent thither.

He begins to Chew his Meat over again within a Quarter of an Hour after his Meals, if he Drink with it; if not, some time longer. This Chewing after a full Meal lasts about an Hour and a half. If he go to Bed presently after Meals, he cannot sleep till the usual time of Chewing be over. The Victuals upon the Return taste somewhat more pleasant than at first. Bread and Meat and Cheese and Drink, does seem to me to Return much of such Colours as they would be of if they were mix'd together in a Mortar. Liquids, as Broth or Spoon-meat, return to his Mouth all one as Dry and Solid Food. The Victuals lie heavy in the lower-part of his Throat, as it seems to him, until it has pass'd the second Chewing; afterwards it passes clean away. This he always observes, That if he eats of Variety of Things,

Things, that which passes down first, comes up first again to be Chewed. If this Faculty leave him it signifies Sickness, and he is never well till it return. He is about 20 Years of Age, and was always thus since he can remember. His Father does so sometimes, and in small Quantities, but nothing like to this. He was formerly bred up in the Mines, but now he is a Day-Labourer, and of tolerable Sense and Reason.

I have known several in *London*, that do not fail to throw up an Ill tasted and bitter Mass, half an Hour or an Hour after Feeding, and that to their great Disgust: but in true *Rumination* it returns Pleasant, and they Chew it the second time with Delight.

XXIX. In *May*, or *June* 1700. A Labouring Man of Middle-Age, at *Stanton* (7 Miles from *Bury*) had for many Days together so inordinate an Appetite, that I had it attested to me from an Eye-witness, that he eat up an ordinary Leg of Veal roasted at a Meal. He would eat Sow Thistles, and divers other Herbs as greedily, during the time his *βελιμία* lasted, as the Beasts that are wont to use such Food; and all he could get was little enough to satisfy his Hunger. I am told he voided divers Worms, as long and as big about as an ordinary Tobacco-Pipe. After which his Appetite declin'd by degrees, till it came to be of a common Rate with that of others. He cannot do so good a Day's Work now as he was wont, but has almost recover'd his wonted Strength again.

βελιμία; by
Dr. James Bur-
rough. n. 264.
p. 598.

XXX. A Minister in *Yorkshire* was troubled with a Cough, and other Mischiefs; for relief against which he took a Journey to *London*, and that, for the most part, on Foot: He liv'd not above a Fortnight after he came up. In his Sickness he was much addicted to drink Brandy, which hasten'd his Death. We observ'd his Limbs to be much macerated, his Belly was Swell'd with some inequality, especially in the Tract of the Right Muscles: A considerable Quantity of Water was taken out of it; his Guts inflam'd, and extended with Wind; his Gall very Viscid; his Lungs inflam'd and beset with divers Glandules. The Order of his Bowels were Inverted; his Liver, which was very large, lay in the Left *Hypochondre* and his Spleen in the Right; the Cone of his Heart was on the Right side, and accordingly the Larger and Thinner Ventricle was found on the Left; and the Thick one, which in others is on the Left side, was in him on the Right. The Great Artery Descended on the Right side, and the Vena Cava Ascended by his Liver on the Left. The Oesophagus descended to the first Orifice of the Stomach on the Right side, which made the Pylorus and Entrance of the Pancreas be on the Left, and the first Flexure of the Small Guts to be towards the Right: So that the beginning of the Colon, with its Appendicula lay at the Left Os Ilium, and the Flexura Sigmoidæa, towards the Right. This Inverted Situation of his Bowels had not any evident Influence upon his Diseases and Death. He was about 30 Years of Age, a Married Man, had several Children, was of a Middle Stature, Healthful till toward the latter end of his time: He had no Prominency on his Left side, more than

The Order of all
the Bowels inver-
ted; by Dr. Henr.
Sampson, n. 107.
p. 146.

than the other; was not Left Handed, nor had any Weakness on his Left side.

The Cæcum of a
Bitch cut out, by
Dr. Will. Muf-
grave. n. 151.
p. 324.

XXXI. In *Easter-Week* 1683. I cut out the *Cæcum* of a Dog; but 2 Days after the Operation the Dog dy'd. But in *Apr.* 1683. I took a Bitch, of about a Year Old, and open'd the *Abdomen*, on the Right side, in the *Regis Iliaca*, passing my Knife through the *Musculus oblique ascendens*, and by the side of the *Musculus Rectus*; having found the *Cæcum*, I immediately put up the other Guts again into the *Abdomen*, after which I separated the *Cæcum* from the *Ilium*, cutting the Membrane which binds part of the former to the latter; then, having made a Ligature on the Artery which comes to the *Cæcum*, I made 3 or 4 Prick-seems thro' the sides of the *Cæcum*, at the farther end of it, where it is continu'd to the *Rectum*, and by thus sowing the sides together, stopt the Passage of the *Fæces* that way; after this I cut off the *Cæcum* about $\frac{1}{4}$ of an Inch from the Stitches, and sowed together the new made Lips. The Wounds being sow'd up, and the Bitch ty'd away, she lapt a small quantity of Milk the next Morning, and by Degrees recover'd: So that in 3 Weeks she seem'd as well as ever; and in a little time grew Fat, and Proud, and brought a Litter of Whelps. In *Sept.* following, I caus'd her to be Hang-ed, and when I had open'd her we found a great part of the *Omentum* lie in a Heap on the Right side; it had not recover'd its Natural Posture since it was put up with the Guts, at the first opening; the Edges of the Wound were well grown together, and we did not find any thing that seem'd to intimate the least want, or supply the place of the *Cæcum*.

The Cæcum di-
lated with an al-
most Liquid Mat-
ter; by M. . . .
. . . Giles, n. 225.
p. 402.

XXXII. *An.* 1689. A Lady, about 64 Years Old, had a hard round Tumour in the Lower Region of the *Belly*. They mov'd this Globe in the same manner as they do the *Matrix*, when it is big with a Child of 6 or 7 Months Old; no Accidents like a *Fever*, Pain, Vomitting, loss of Blood, *Fluor Albus*, &c. accompanied this Tumour, but a constant voiding of Urine. The Physicians after much Search and Consultation agreed, that it was a *Schirrous*; but some plac'd it in the *Epiploon*, others in the *Mesentery*, and others fasten'd it to the *Matrix*. In view of this they gave her *Emetiques*, strong *Purgatives*, *Diureticks*; they apply'd *Emollients* and *Resolvents*: but all to no Purpose. But having taken the Air one Day in her Coach, at her return she had an Inclination to go to Stool, and fill'd a Bason with gross Excrements, a little black and not very stinking: This she did a second time; and found her self immediately reliev'd, her Swelling disappear'd, her Urine stopt, and in a few Hours she was perfectly well.

A Year after that, she fell into an *Apoplexy*, out of which she recover'd by *Emetiques* and *Purgations*. In 1671. the Tumour shew'd it self again with the same Marks as before, and all possible Care was taken to make Nature do again what she had before done with so good Success. But tho' the *Purges* and *Clysters* did very strongly their Office, she was nothing reliev'd; the Tumour augmented daily, and two Years after its first appearing the Party dy'd.

When

When I had open'd the Body, the *Tumor* appear'd to be nothing else than the *Cæcum* dilated; its Membranes were outwardly smooth, and of the same Colour with the *Intestines* without Alteration, and full of Vessels of all Sorts. The *Ileon* laid along the *Tumor*, being flat against it, and return'd to joyn the *Colon* as is usual; so the Excrements had the liberty to pass from the *Ileon* to the *Colon*, without entering into it. I found in this *Tumor* about 3 *Chopins* (or *Quarts*) of Greyish Matter, without Smell, and of a Consistence rather Liquid than Thick. The Interior Membranes were very beautiful; and all the parts of the *Swelling*, as well as of the neighbouring Organs, appear'd very sound.

I could not discover any Hole, or Communication this *Tumor* might have had with the *Ileon*, yet some there must have been in the beginning by which it discharg'd its gross Excrements; but after this Evacuation I believe that this Opening was stop'd, and that the Sides of this great Bag, which had come close together by the going out of this gross Matter, did by Degrees stretch and open themselves to receive this Heterogeneous Stuff, which I found there, produc'd either by the *Glands* of these Parts, or some *Lymphatick Vessels* which I saw there, or some Fluid Bodies express'd from the *Cælye*, or other Humours. The Compression which the *Tumor* made on the Bladder, made the Urine run out as fast as it came in; its *Sphincter* not being able to resist the Violence of this Load.

XXXIII. Mr. Knowles being call'd to open a Youth, who dy'd, as was suppos'd, of the *Cholick* and *Convulsus*, found the *Cæcum* vastly extend-
ed, and stuff'd with abundance of Cherry-stones, which were the Occa-
sion of his Death.

*The Cæcum en-
tended with Cher-
ry-stones; by
Mr. Knowles.
n. 265. p. 617.*

XXXIV. We have observ'd (among many other Particulars in the *Guts*) the Use of the *Intestinum Cæcum* to be subservient to that of the *Colon* and *Rectum*, which is manifest in such Animals, where Nature intends a certain and determinate Figure to the Excrements.

*The Use of the
Intestinum Cæ-
cum; by Dr. M.
Lifter. n. 95.
p. 6062.*

I understand by Determinate Figure, 1. The Excrements divided into many small Parts of a like Shape; such as Sheep, Deer, Conies, Hares, Rats, Mice, Horses, Caterpillars, some Snails, &c. do naturally void. 2. In a greater Latitude, I oppose Figur'd Excrements to Liquid, as *C. Cælus* in some Place doth: Thus the Dung of Pigeons, Geese, and Men, Cats, Dogs, &c. may be said to be Figur'd. Now the *Cæcum*, in my Opinion, is subservient in some Measure to the Figuration of both, but most Manifest in the first Kind. My Meaning is, That probably the Use of the *Cæcum* is to keep the Excrements, which shall pass into its Cavity (and I believe all, or most part of them, do so in sound Animals) so long until they are sufficiently drain'd, bak'd, harden'd, or of a due Consistence (as Clay is temper'd for the Mold) to receive the Figure to be given it from the *Colon* and *Rectum*. This Use, I say, of the *Cæcum*, seems to me to be much more manifest in such Animals, as have Figur'd Excrements of the first Kind. In Rats, for Example, whose Excrements are constantly alike Figur'd, the *Cæcum* is very large, more Ca-
pacious

n. 155. p. 452.

capacious than the Stomach itself. But its Use in receiving the Excrements, or exhausted *Chyle*, is not more apparent, from its large Capacity, than that other of farther Drawing and Tempering them to a Stiffness, for the Service of the *Colon*, from the admirable Contrivance and Structure of this latter *Gut*, which is a *Phænomenon* that deserves further Consideration: It is, I say, to be noted, that immediately under the Valve of that *Gut*, in this Animal, are certain Spiral Fibres, which make a kind of Screw. Now it seems to me, that the Excrements, after they are brought to a due Consistency by the necessary Stay they make in the *Cæcum*, and being carry'd out thence into the Spiral Foldings, or Screw, of the *Colon*, cannot descend into a Perpendicular, as formerly through the small Guts, but still gently glide, and that very leisurely by the winding of the Screw; whence arises the Figure. And I am apt to believe, that if the *Cæcum* of a Rat, or any of the first Kind of Animals mention'd, was ty'd up, or otherwise hinder'd from its Receipt, the Animals would unavoidably fall into a *Diarrhæa*; there being, I say, no Reason, that I can foresee, why the yet Liquid Excrements, or exhausted *Chyle*, such as we constantly find it, even at the very Bottom of the *Small Gut*, should stop at the Entrance of the *Colon*, and not speedily glide through the Screw, in a downright Descent; that is, elude the Device of Nature, and make the Configuration of that so curiously contriv'd Part useless; we, I say, supposing the Experiment to have taken away the necessary *Diverticulum* and Repository of the unprepar'd Excrements, in tying up the *Cæcum*.

I know not whether the Observation will hold good in general Terms, because, I say, I have not yet purposely examin'd divers Animals in Nature; *viz.* That where-ever there are elegantly Figur'd Excrements of the first Kind, there is ever a Capacious *Cæcum*; and on the contrary, the less accurately Figur'd and more Liquid the Excrements of any Animals are, the lesser the *Cæcum*, or none at all. This is certainly true, That some Animals which are naturally loose, have no *Cæcum* at all, or very little, as the *Talpa*, the *Echinus Terrestris*, the *Gulo*; and amongst Birds, the *Woodpecker* Kind, the *Hawk* Kind, &c.

We forbear to offer some Doubts we have, concerning Nature's End in the necessary Figuration of the Excrements in some Animals; as first to prevent *Diarrhæas*; Secondly, to abide Hunger the better, thus Snails in Winter rest with full Intestines; Thirdly and chiefly to heighten the *Fermentation* and *Digestion* in the Stomach and Small Guts.

An infallible
Cure of Dysent-
eries; by M. . .
... n. 238, p. 69.

XXXV. 1. The Root *Ipecacuanha* is an infallible Medicine for Curing *Dysenteries* and Loosnesses, how Dangerous and Inveterate soever the Distemper may be. But I must except all such Patients as are Diseas'd in their Lungs, and *Hydropick* Persons, whose Fluxes are Signs of approaching Death; and such as have already *Gangreens* in their Bowels, which they surely discover when they are disorder'd in the Head, have a *Hiccup* and a Vomitting, with a Pain in the lower Belly, accompany'd with Stools resembling the Dregs of Wine, or the Washings of Meat, Smelling like Car-
rion.

tion. As for all others, Sick of a *Dysentery*, they need but to observe the following Rules, and they will be Cured.

For 3 Days together, Morning and Evening, they must take one of the Papers of Powder mark'd with *A*, Diluted with half a Glass of Wine and as much Water, to dispose them by Degrees for Purging, and to sweeten and correct the sharp corrosive Humours, which are of the Nature of *Aquafortis*, and the Spirit of Nitre, and which eat away the Tunics of the Intestines, and the Mouths of the Vessels; from whence it comes to pass, that from a single Looseness they often fall into a *Dysentery*, because those deprav'd Humours become sharp and corrosive, and the Malady augments every Day: So that to make a sure Cure, we must begin by destroying the Sharpness and Malignity of those Humours, which is done by this first Remedy.

A. R. Antim. Diaph. Crabs Eyes, of each *gr. 10. Croc. Martis*, *gr. 8. Mace*, *gr. 4.* He must eat small Broth 2 Hours after, or a Crust of Bread dip'd in it, or a fresh Egg in fashion of an Amulet, and Dine lightly; if they find they have need of Nourishment, after Dinner they may eat a Toast and Wine and Sugar, or a little Bisket steep'd in Water or Wine. At Night they may take another Paper mark'd *A*, as before, and Sup lightly.

The 4th Day they must take the Dose mark'd *B. R. Of good Ipecacuanba*, well Pulveris'd, *3j.* with *3vi.* of *Cinamon*, diluted in small Broth, or in half a Glass of Wine, to clear the Stomach of a viscid Bile, that weakens the Natural Heat, and hinders the Digestion of the Food; so that the *Chyle* growing sour, instead of growing bitter, does change all the Mass of the Blood, and trouble the whole Oeconomy of the Body, which produces all the Accidents which ordinarily accompany this Disease. They shall take, 4 Hours after, some Broth, and the remainder of the Day eat sparingly; the Day after they shall take 2 Papers mark'd *A*, as before.

The 7th Day they shall take the Medicine mark'd *C. R. Good Rubarb*, *ʒij. Ipecacuanba*, *gr. xv.* Pulverise them well, and mix them in a Glass of *Prisan D*, describ'd hereafter. This Medicine will take away Part of the Obstructions; they shall take, 2 Hours after, Broth.

The 9th Day they shall take the Dose mark'd *B 2. R. Good Ipecacuanba* *ʒij.* with *Cinnamon*, *gr. vi.* well Pulverised, and mix'd with Broth or Wine.

The 11th Day they must take a 2d Medicine mark'd *C*, and observe the same Regimen as at first.

On the 13th they must take the Dose mark'd *B 3. R. Good Ipecacuanba* *ʒj.* half a *ʒ* of *Cinnamon*, with *vi. gr.* of *Nutmeg*, and observe the same Diet as on the two others.

On the 15th they shall take the Dose mark'd *B 4. R. Good Ipecacuanba* *ʒj.* with *Nutmeg* *gr. x.* well Pulverised. They must keep themselves as on the 3 former Days.

Tho' by this Time they find themselves Cur'd, yet they must take Care that they suffer not Cold in their Feet, nor elsewhere, while the Distemper continues, and they must yet observe as strict a Diet as if they were Sick. They must Purge once in 15 Days with the Medicine mark'd *C*, by

which Means they will infallibly prevent a Relapse, by freeing Nature of the Weight that oppresses it.

The 8, 10, 12 Days they shall take in the Morning and Evening one of the Packets mark'd *A*, as before.

If the Sick has no Rest in the Night-time, because of great Pains, or too frequent Stools, 'tis convenient to take a Spoonful, or one and a half, of the *Syrup of Coral*, according to the Violence of the Distemper, mix'd with a Glass of *Psisan*. This Syrup will allay the Fermentations, and the Boilings of the Humours, and procure Sleep, which repairing the Force of Nature, will give the Remedies Liberty to Act more effectually. We must also take a Spoonful of that Syrup at the Evening of that Day, in which they have taken the Remedy, *B*, or *C*.

All these Remedies mark'd before, must be taken in the Morning Fasting, and 2 Hours before Supper. Those who do not love to take them mix'd with Liquor, may take them in a Wafer, drinking after them. If any of these Remedies cause Vomitting, as it happens sometimes, one must not be discourag'd, for he shall not fail to be Cured notwithstanding, because these Remedies Act briskly on the Cause of the Distemper, only he must take to drink, after his Vomitting, 3 or 4 Glasses of Warm Water, that he may Vomit with less Pain.

Children, Delicate Persons, and Women with Child, shall use it in the following Manner. For Children that are yet under 3 Years Old, they must take but the 8th Part of the Doses of the Remedies; Children from 3 Years Old to 10, shall take a 4th Part, from 10 to 15, a third; from 15 to 20, the half. The same Dose will serve for tender Persons, and such as are aged, and Women big with Child. As for Robust Persons, from 20, to 60, nothing shall be diminish'd from the Doses above mark'd. But all Persons, who by reason of their tender Constitution, the weakness of their Age, or big Bellies, are forbid the whole Dose, shall use the Remedies a second time, in the manner I have now prescrib'd, if the first Dose do not Cure them.

In many Occasions, when the *Dysentery* is accompany'd with a *Fever*, that the Evacuations of Blood are extraordinary, or the Pains excessive, the Patient may be Blooded once or twice, if the Strength of the Patient allow it, to empty the Vessels, to calm the Pain of the *Fever*, and stop the impetuous Motion of the Blood; after which the Remedies may be continu'd. In this Case, I would advise to take, before all Things, the Packet *B 4*, which before is order'd for the 15th Day; to take away that Fulness which is sometimes so great, that there is Danger in delaying it; after which the Patient shall return to the Dose mark'd for the first Day, and so for the rest; on the 15th the Patient shall rest.

After all these Remedies are used, the Parry shall take, for 15 Days, a Spoonful of the *Stomachick Elixir*, pure, or in 4 Spoonfuls of Water; 'tis made after the following Method.

Stomachick Elixir.

Rc. Of *Red Saunders*, of *Lignum Aloes*, each half an Ounce; *Cinnamon* 2 Ounces; of little *Cardamoms*, *Galangal*, *Cloves*, *Zedoary*, each an Ounce; of *Anise-seed*, *Fennel*, and *Kermes*, each 2 Drams; of *Liquorish* 2 Ounces;

of

of *Cassia*, of *Chryſtal Mineral*, of each one Ounce ; of *Raiſins* 4 Ounces ; *Dates* 10 or 12 ; cut the *Dates* and the *Raiſins* into little Bits, and having beaten that which ought to be beaten, put all into a *Matras*, and pour upon them a Quart of Brandy, in which the *Chryſtal Mineral* ſhall be diſſolv'd ; infuſe them a whole Night, and the next Day add 2 Pounds of *Aqua Viæ*, and let all infuſe in the Cold for 4 Days, ſhaking the Glaſs 4 or 5 times a Day, then Filter the Liquor, and diſſolve a Pound of fine Sugar in the *Elixir*, which is thus compleat.

Its Effect is to fortify the Brain, the Heart, and all the Noble Parts, weaken'd by the Diſſipation of the Spirits to fortify the Stomach, and correct the Crudities, and diſſipate the Wind and Swellings thereof, which are common Accidents of this Diſtemper.

One muſt, during the Courſe of this Diſeaſe, Eat little, and only ſuch Things as are of good Nouriſhment ; as Broth made of a Piece of Beef, of the bloody End of a Piece of Mutton, or a Partridge, or an old Cock, whoſe Bones have been broke, and that without Herbs ; inſtead of which one may take 2 or 3 White Onions, with as many Cloves in them, reſtraining boil'd Meats, when one can have other Nouriſhment, till he feel himſelf perfectly well, becauſe they load the Stomach ; and Eat, to Dinner and Supper, Roaſt Meats, tender and Nouriſhing, that are not Larded, Chewing the Meat well before-hand ; to drink at his Repaſts old Wine and Water, and take for his ordinary Drink the *Prifan* after-mark'd. Above all Things, the Patient ought to keep himſelf in a quiet Frame of Spirit, that he ſuffer himſelf not to be transported by any Violence of Paſſion, the leaſt of which is able to raiſe a new Ebullition of the Blood, and to trouble the Humours.

If the Patient be not Rich, and cannot go to the Expence of theſe Aliments we have mention'd, he may make Broths as he is able, or Milk-Meats, or Food with Water, as ſhall moſt agree with his Palate, with many freſh Eggs ; this Sort of Nouriſhment will cover the affected Part, and will defend it and preſerve it againſt the Sharpneſs of the Humour.

'Tis very neceſſary for the Diſeas'd to forbear much Drinking, undiſcreetly to quench their Thirſt ; for the Heat and Thirſt which they feel, are only Symptoms and Accidents of their Diſtempers, and not the Cauſe ; they ought therefore to be more moderate in Drinking than ordinary, ſeeing nothing hurts them more than Exceſs of Drinking, which weakens the Stomach, and ſtiſſes the Natural Heat. 'Tis therefore convenient only to Gargle the Mouth with Water Sugar'd, or to keep a little Verjuice in their Mouths, that may keep them from being Thirſty ; but if he drink, it muſt not be till one Hour after Meals. And ſeeing it may fall out that ſome are Enfeebled and Emaciated by the length of the Diſeaſe, 'twill be convenient in the Intervals to give them Clyſters made of Broth, which will ſerve to maintain them, and to bring them more quickly to their Strength. After the Uſe of the Remedies, they may, to keep themſelves in a good Habit of Body, take Goat's or Cow's Milk, with a little Chocolate, which we leave to the Judgment of the Phyſician, putting always to it a little grated Nutmeg, and 4 or 5 Grains of Salt in the Milk, that it may not curdle ſo ſoon.

For

Pisfan.

For the ordinary *Pisfan*. R $\acute{e}$. of *Red Saunders*, the *Rind* of the *Pomegranate*, a. $\mathfrak{z}$ j. *Tormentil Roots*, $\mathfrak{z}\beta$. *Wild Succory*, and *Dandelion*, a. $\mathfrak{z}$ ij. choice *Sumach*, $\mathfrak{z}$ ij. *Leaves of Agrimony*, 2. pug. Make all Boil over a clear Fire, in 6 Pints of Water, which ought to be boil'd to one half; at the end of the Decoction, as you take it off the Fire, add to it two *Drachms*, of *Cinnamon*, and as much Powder of *Liquorice*.

If all these Things cannot be had, use a Decoction of *Dandelion* in *Smith's Water*, with a little *Cinnamon*.

Clysters.

If the Pains, which accompany the Flux, continue while he uses the Remedies that serve for Purgation, he shall take, as there is need, *Clysters* made after this manner. R $\acute{e}$. *Shepherd's Purse* two Handfuls; *Linseed*, $\mathfrak{z}\beta$. *Red Roses*, 2 *Drachms*, *Salt* a Handful. Make all Boil in a Decoction of *Barley*, strain it, and mix with it the *Yolk* of a fresh *Egg*, and 2 *Ounces* of *Honey of Roses*. If the Pains be very violent, one may add two Heads of *White Poppy*. But Care must be taken not to mistake the Pains of the

For the Hemorrhoids.

Guts for the Pains of the *Fundament*, which may be open'd by the *Hemorrhoids*; to appease these Pains, one may use *Juniper Oyl*, drawn by a Retort in an open Fire, from which the Spirit is separated by the Tunnel. If the *Hemorrhoids* be Outward, you must rub them with this Oyl with a Feather, every 4th Hour; or if they be Internal, one must Syringe them with a quarter of a Spoonfull of this Oyl, the Pain will cease in less than 2 Hours, and the *Hemorrhoids* will whither away, without having need of applying any other Medicine. This was communicated to me by *M. Gaselier*, one of the best Artists of his time and employ'd by *M. Colbert* for his Surgeon.

Some Notes; by
Dr. Hans Sloan.
Ib. p. 78.

2. Altho' I am of Opinion, That the *Root* mention'd in the foregoing Paper is not so infallible a Remedy for *Fluxes* as is pretended; yet considering that sometimes those Distempers yield not to ordinary Means, I think it ought to be considered of by proper Judges of the Circumstances of the Sick.

Purchas's Pilgr.
Vol. IV. Lib. vii.
Cap. 1. Sect. 5.

This Herb seems to have been first taken Notice of by an Anonymous *Portuguese*, who liv'd in *Brasil*, and speaks of an Herb there call'd *Igpecaya*, or *Pigaya*, which I verily believe to be this.

Igpecaya or *Pigaya*, says he, is profitable for the *Bloody-Flux*; the *Stalk* is a quarter long, and the *Roots* of another, or more; it hath only 4 or 5 *Leaves*, it smelleth much wheresoever it is, but the Smell is Strong and Terrible; this *Root* beaten, and put in Water all Night at the Dew, and in the Morning, if this Water with the same *Root* beaten and strain'd be drunk, only the Water, it causeth presently to Purge in such sort, that the *Lask* ceaseth altogether.

A Convolvulus
and an unusual
Rupture of the
Mesentery; by
Fr. Swammer-
dam. n. 112. p.
273.

Fig. 15.

XXXVI. Fig. 15. Representat *Convolvulum* sive *Affectum Iliacum* lethalem, ex Ruptura & Circumvolution *Mesenterii*, *Intestina* constringentis, ortum. AA, *Intestinum Ileum*, Chylo, Flatu, & Ingestis, mirum in modum turgens, atque inflammatum. BB, *Mesenterium* Diruprum, constituens Vinculum quoddam, *Intestina* funesto Fato circumligans. CC, Notatum Vinculum, ex Rupto *Mesenterio* ortum, ac, *Capreoli* ferè in modum,

dum, Intestina neſcens. DD, Vinculum illud ſeorſim delineatum, una cum ejus Capreolo, duabus Circumductionibus conſtans. EE, *Convolutus* Intestini, ſeu *Ilei* pars Vinculo fortiter coarctata, ac Sphacelo proxima; à quo Alvus omninò adſtricta fuit, adeo ut tenuium Intestinatorum Contenta, Vomitu ſerè continuo, ſurſum propulſa fuerint. F, *Ilei* pars, violentà illà ac incomprehenſibili Trajectione Intestini per Ligamentum DD, contra Naturam extenſa, atque Intestinum quoddam *Cæcum* mentiens. G, *Ilei* extremum, ubi in *Colon* degenerat. H. *Colon* modicè contractum, & naturaliter ſe habens. L, Intestinum *Cæcum*.

XXXVII. Mulier quædam *Alceſtrenſis* in Agro *Warwicenſi*, annos quaſi quadraginta nata, à vicino Oppido domum rediens, ſubito corripitur Dolo-
 re vehementi *Inguinis* Dextri, cui ſucceſſit Singultus violentus: poſt Semi-
 horam Tumor ibidem oritur ad quantitatem Nucis *Mofchatae*, qui ſenſim fit
 durus, & tandem niger. Mulier Febre & aliis Doloribus adeo vevatur (nul-
 lo in Auxilium Medico vocato) ut ſui impos neminem aſtantium cogno-
 vit; ita ut precibus publicis Deo commendaretur, tanquam jam moritu-
 ra: Tandem Applicatione nescio cujus *Cataplaſmatis*, aperitur Bubo; à
 quo aperto quicquid Bibit Editve, immutatum plerumque, intra Horæ qua-
 drantem vel dimidium, exit ſine vel minimo, ſeu in *Ulcere*, ſeu in *Intestinis*,
 Dolo-
 re; Ita ut cum die quodam Lac coctum comediffet, ex *Ulcere* pri-
 mò Lac ipſum, poſtea coagulatum, cum Crepitu (tanquam ab *Ano*) &
 Spuma erupit. Tandem Ego vocatus invenio Fœminam *Hæſticam*, Ema-
 ciatam, Sicibundam, Urinam tamen Sedesque ſine ullo Dolo-
 re ſtatis tem-
 poribus deponentem: *Ulcus* 3 vel 4 Digitos longum, latum vero unum, mi-
 nime profundum, ſed cum Cute pene æquale. Ptifanam laxan-
 tem mit-
 to pro 4 Doſibus; ſed cum Doſis prima ſtatim per *Ulcus* effluxerit, nulla
 Sede per Diem ſequuta, Bolum dedi Purgantem; poſt Semihoram etiam
 iſtius partem emittit; poſtea tamen Sedes duas, cum multo minore, quam
 ante, ab *Ulcere* Effluxu. Eundem Bolum Die ſequenti cepit; unde Sedes
 tres, eaſque amplas, habuit, cum Scybalis multis; *Ulcus* vero parum e-
 mittit, totam per Noctem. Exinde Potus exſiccantis, & Tranſmatici Li-
 bras duas vel tres quotidie hibendas, interdum Bolum etiam repetendum
 ſuadeo; horum Uſu per Dies 14 (ut memini) Sana evaſit.

The Faeces di-
 charged at an Ul-
 cer in the Groin;
 by Dr. Will. Earn-
 ſhaw. n. 176.
 p. 1204.

XXXVIII. 1. We have found in the Guts of a Dog, perhaps more than
 100 of the *Lumbrici Lati* or Tape Worms. The Duodenum was exceedingly
 ſtuffed out and extended with them. Which alſo well agrees with ano-
 ther Obſervation I made in a Mouſe, where I found the Duodenum to be
 far bigger than the Stomach itſelf, by reaſon of the great Numbers of
 theſe Worms, for kind, which were contained in it. For kind, I ſay;
 for theſe Tape-worms were of a quite different Shape from thoſe of the
 Dog, or any that I have ever yet ſeen. To proceed, we found them alſo
 in the Dog's Jejunum and Ileum, but not any one lower than the *Valvu-
 la Coli*, nor any higher than the Duodenum, or within the Pylorus. Below
 the Duodenum they lay at certain Diſtances one from another, though
 ſometimes by Pairs or more of them twiſted together; near them was
 conſtantly.

The Lumbrici
 Lati and Cucur-
 bitini; by Dr.
 M. Liſter. n. 95.
 p. 6052.

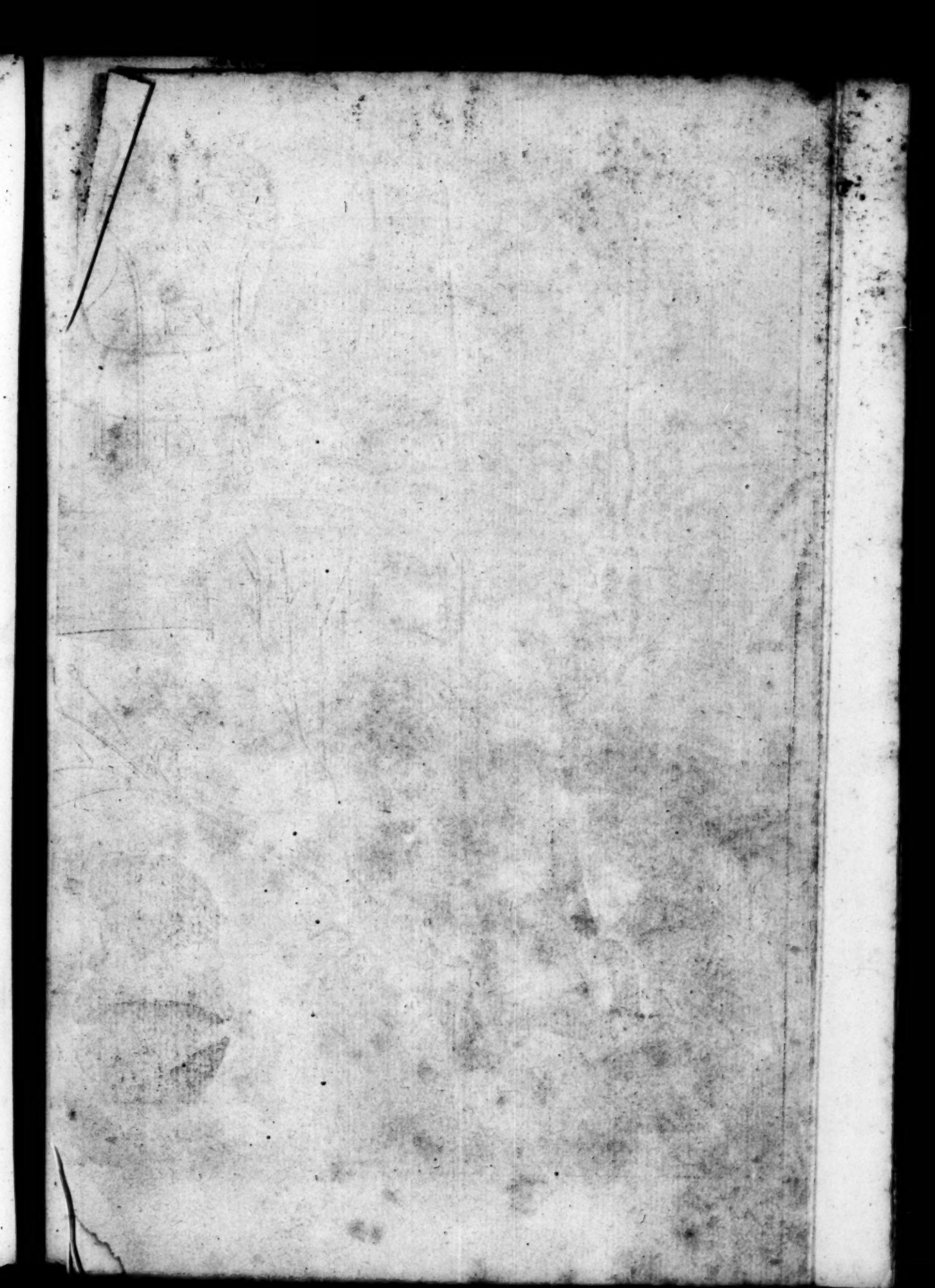
constantly to be observ'd an Excrement of their own, distinct for Colour (more Grey) and Consistence from the *Chyle*, (the Observation being made in a Dog plentifully fed for other purposes) just as we find in Worm-eaten tracks of Wood, where the *Cossi* leave behind them the Wood which hath pass'd through their Bodies. These *Worms* lay mostly with the small ends upward, as feeding upon and expecting the *Chyle* in its Descent. These *Lumbrici Lati* were none of them above one Foot long, and most of them of an equal length and bigness. The one end was as broad as my little Finger Nail, and pointed like a Lancet; the other end, coming small gradually for the 3d part of the whole length of the Animal, was knotted, or ended in a small Button like a Pin-head. They were every where and in all parts of them alike Milk-White, of a flat and thin Substance like fine *Tape*, divided into infinite Rings and Incisures; each Incisure having sharp Angles, on both sides, looking to the broader end, standing out beyond each other: From which also I take the small end to be the Head; else the sharp Corners of the *Annuli* would necessarily hinder the Ascent of the Animal; whereas, if the contrary be true, they serve to keep it up. Each Ring hath also on the one side only, and that alternately, one small Protuberance, much like the middle Feet of the Body of some Caterpillars. Comparing our Animals with the Cut of *Tulpius*, it was not very easy for me to observe, because of the great resemblance, the Specifick Difference of the *Lumbrici Lati* of Men and those of this Animal. I could not discover any Motion in any part of them, in Water or out of it, nor did they seem, if prick'd, or otherwise hurt, much (if at all) to contract themselves, or shorten the *Annuli*: So that they then appear'd to me as things without Motion or Sense.

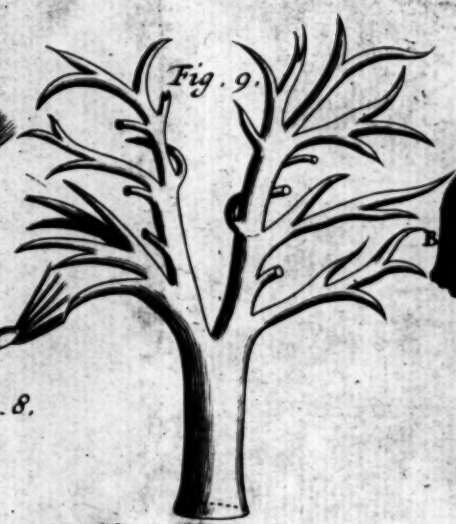
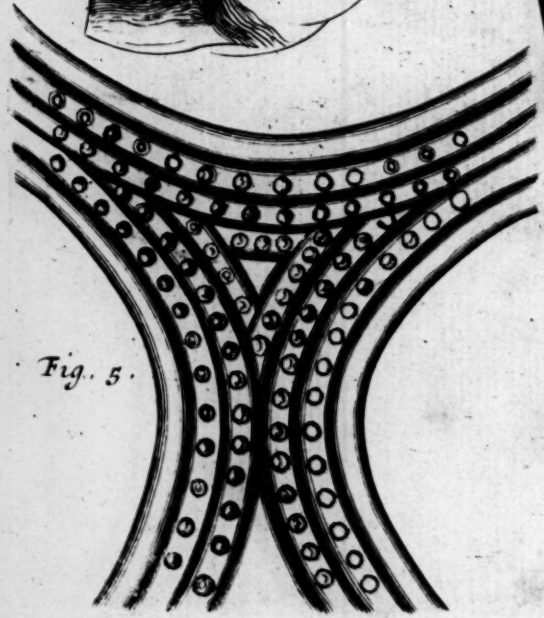
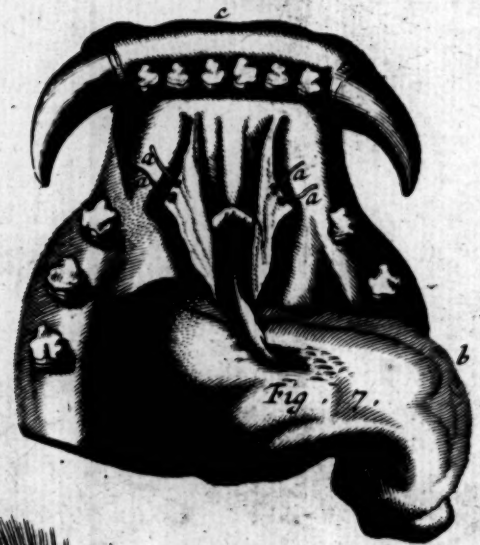
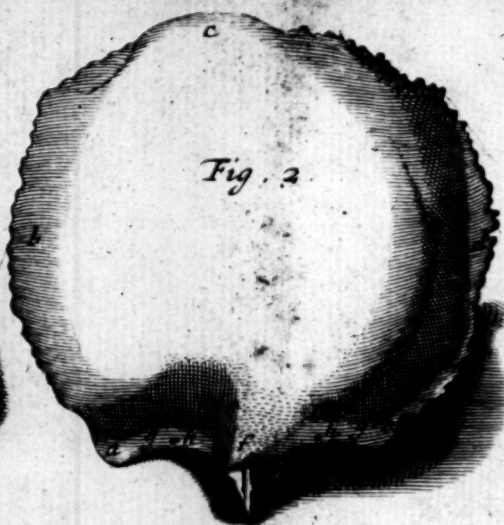
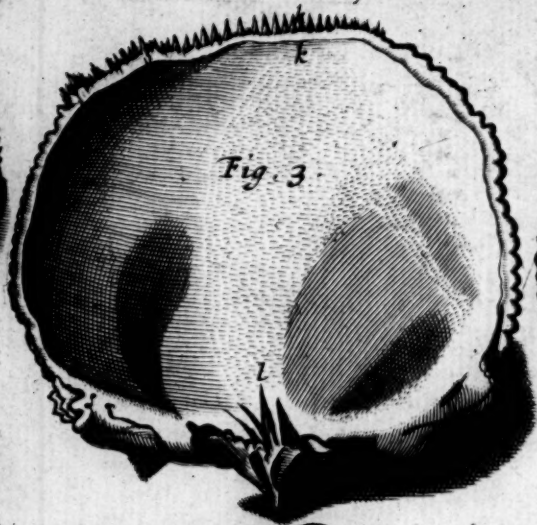
Medic. Observ.
p. 2. c. 42.

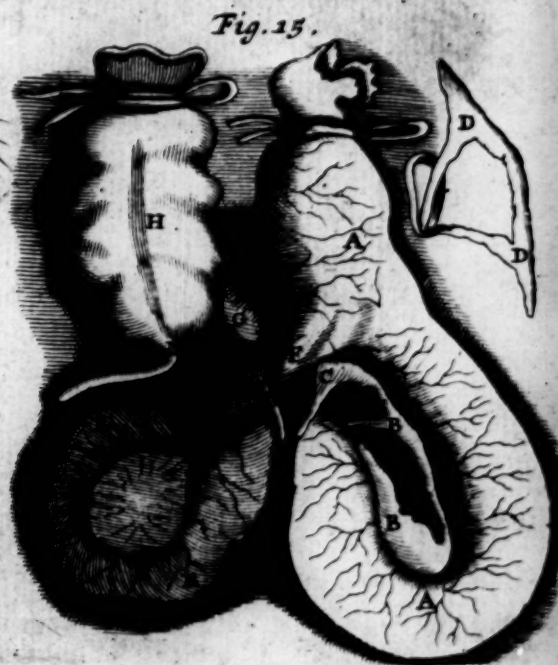
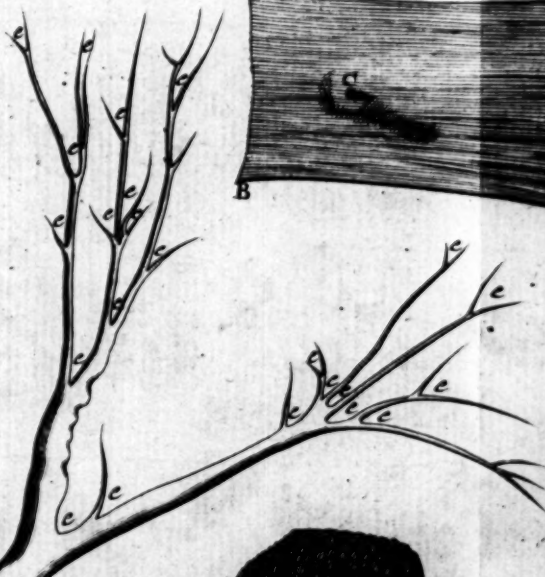
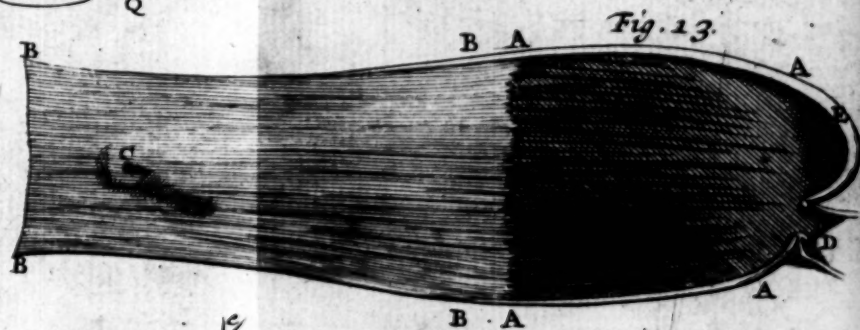
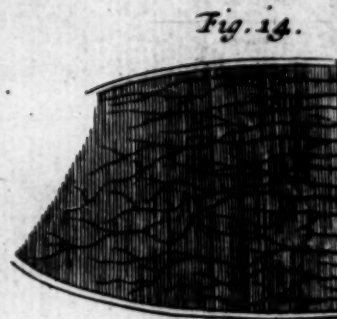
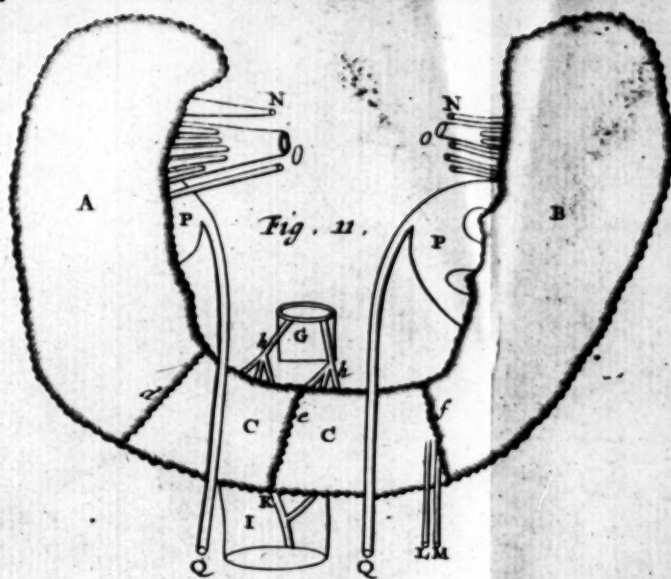
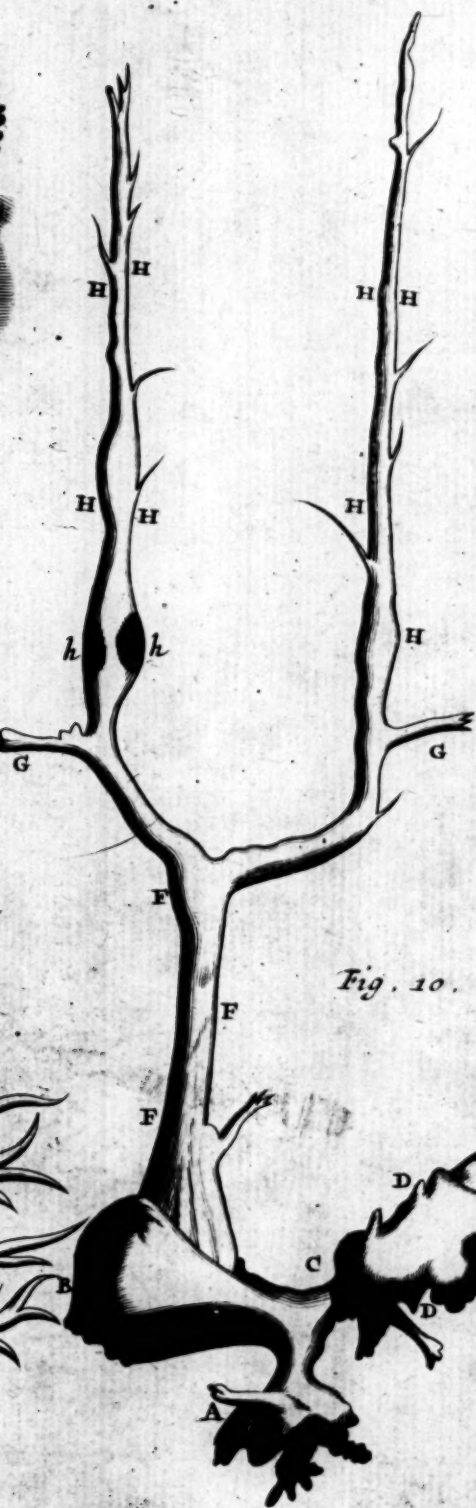
ib. p. 604.

2. There is another sort of *Lumbrici Lati*, to be met with very frequently also in Dogs, call'd *Cucurbitini*, from the likeness each *Annulus* or Link hath to a Cucumber-Seed. I have found of them about half a Foot long; but more often broken into shorter pieces. The former by us describ'd is undoubtedly a compleat and entire Animal; but there is great Reason of Suspicion, that this is a Chain of many Animals link'd together. These Animals, for kind, have been observed to have been voided by Men, and found enclos'd in a Gut or Membrane of a prodigious Length. And a Person of great Integrity affirm'd to me, That he once assisted at the opening of a Dog, in which one of the Kidneys was observ'd to be quite wasted and become a perfect Bladder, and in that Bladder they found something like an Animal of a monstrous Shape, which being Dissected was nothing else but a Skin full of these *Lumbrici Cucurbitini*. Perhaps, the Snakes, Lizards, Beetles, Caterpillars, Toads, and such like things, as we read of in Medicinal Histories to have been Voided, or found in any part of the Body, if carefully examined were nothing else but the like Disguises of this sort of *Worms*, much assisted by the surpriz'd Fancies of the first Observers.

Lumbrici Cucurbitini found
in the Kidneys of
a Dog. *ib.*









XXXIX. The curious Researches of many Inquisitive Persons after the manner of the Generation of Insects, and their Discoveries therein, have much advanced the Doctrine of *Univocal Generation*. Yet one great Difficulty remains with me, how to account for several of those that are bred in Animal Bodies; not such as we may suppose to be hatch'd from the Eggs of the like Kind, that are receiv'd with the Food or otherways, but of which we cannot meet with a Parallel, or of the same Species, out of the Body, in the whole World as is known besides. I shall Instance only in two, the *Lumbricus Latus*, and *Teretis*, which remarkably differ from any others out of the Body, from whence, or from the Seed of the same, it may be any ways thought they may be propagated in it. But tho' we are gravel'd in assigning how first these sorts of Worms should come into the Body; yet being once there, there is nothing more plain, than that the *Lumbricus Teretis* is propagated by an *Univocal Generation*; there being in this sort so perfect a Distinction of Sexes, Male and Female; and the Organs belonging to each so curiously contriv'd, so conspicuous and plain, that they may further illustrate the late Inventions of some; and do seem to shew, how solicitous Nature is in preserving and propagating the meanest Species.

7th Lumbricus
Eatus; by Dr.
Edward Tyson.
n. 146. p. 113.

I have made Observations upon both sort of these Worms; those on the *Jointed-Worm* I shall here give you.

1. This Worm is *Flat*; and hence 'tis call'd *Lumbricus Latus*; and by Hippocrates, *Tavia* i. e. *Fascia*, and by some in English, the *Tape Worm*. This *Flatness* of the Body, sufficiently distinguishes it from the others, which are usually bred in the Body; and are either short and small, and then call'd *Ascarides*; or Longer, as the *Teretes*. Nor is there any out of the Body, that I know of, that are thus *Flat*. The Breadth of this Worm is various, both in the several parts of the Body of the same Worm; as also in one Worm compar'd with any other. The Longer the Worm is, the Broader usually are the latter *Joints*.

2. The *Joints* of this Worm are so set on, that the Lines or extream Edges of the former, come over the latter; which is to be well observ'd, and may direct us to that part or extream, where we may suppose the Head to be placed. These Edges of the former *Joint*, which shoots over the latter, in some I have observ'd to be Plain and Smooth; in others Crenated, and Indented; in all, by drawing it through one's Fingers from the Tail to the Head, you will find a great Roughness; but if the other way, from the Head to the Tail, it seems Smooth.

3. Many, who have observ'd this Worm, do take notice of the difference of it's *Extreams*; how much larger one is than the other; but not well considering the setting on of the *Joints*, abundance have been misled into an Error, by taking the Head for the Tail. Thus *Spigelius* and *Amatus Lusitanus* make the Slender part of the Body to be the Tail. But in all I have hitherto observ'd, I constantly found that *Extream* where the Head is set on (if we may allow it to have any) much Smaller than the other; sometimes not half a quarter so broad; in others lesser or greater, often

according to the Length of the *Worm*; but in all I take notice, if they are of any considerable Length, that the *Joints* toward the *Head* are vastly shorter, than towards the *Tail*: For in one I have by me 24 Foot long, there about 5 *Joints* make an Inch, whereas the latter *Joints* here are above an Inch long; but in some I have taken out of Dogs, there were 30 or 40, sometimes above 60 *Annuli*, which towards the *Head* did make up but the length of an Inch; whereas towards the *Tail* 6 or 7 *Joints* did equal that measure, and sometimes 3; so that gradually the *Joints* seem to increase, both in Length and Wideness, as they approach the *Tail*. But withal it must be observ'd, that according to the Corrugation or Extension of these *Joints*, their Dimensions will be alter'd, which is most apparent in them when alive; That likewise there is a great difference of these *Joints* in the various Species of this *Worm*, (for I think there are more sorts than one.) And as to the Differences of them, there are these I have taken notice of. 1. That in most, the *Joints* gradually, and very sensibly, increase in Length; but in a vast Quantity of this *Worm*, voided by a Person here in Town, but in several pieces, 2, 3, 4, or more or fewer Yards long, I observ'd for a great length the *Joints* much the same; but I suppose I saw here neither the *Head* nor the *Tail*. 2. In some those *Orifices*, which I take for *Mouths*, were placed about the middle of the *Joints*, on the Edges; in others, about the middle of the *Flat* of the *Worm* near the *Jointings*. 3. These *Fittings* or Lips of the Upper *Joints* over the Lower, in some were plain, in others Crenated, in others, the great protuberatings at the Side render'd the whole *Worm* Serrated. 4. Usually the same *Joint* is much of a bigness throughout; but the Upper Extream something lesser than the Lower. But in one I took out of a Dog, I observ'd that in some of the last *Joints* towards the *Tail*, the upper part of the *Joint*, by which 'twas fasten'd to the fore-going *Joint*, was very slender, in the middle broad, and toward the other Extream grew Taper again. But in another I took out of the same Dog, I could not observe the same thing; as neither did I in a 3d, I took out of another Dog, which was about 2 Yards long; whereas these were each 1 Foot or 1½ Foot long. 5. This *Worm* lies Convolved in several places; and it is sometimes as long as all the Guts, and sometimes vastly exceeds that Length. *Olaus Borrichius* tells us, that a Patient of his in a Year's time, has voided 800 Foot of this sort of *Worm*, but in several pieces; and that hitherto he has not met with the *Head*. For the Patient observ'd, that always in the Voiding it, he perceiv'd it break off. I can Parallel this with an Instance of a Person here in Town, once my Patient, who has Voided vast Quantities of this *Worm* for several Years together; but in several pieces, 2, 3, 4, 6, or more Yards long; but all put together, would much exceed the length of that of *Borrichius*. But to be at any certainty in this particular, I think is very difficult: For when it comes to any considerable length, by lying in several Clusters, or Convolutions, in the *Intestines*, the Descent of the *Feces*, especially being quickn'd by a Purge will be apt to break part off; which yet still will live, and grow till quite carry'd out of the Body. Besides, I question whether all those pieces which are Voided by the same Person,

Person, may be always reputed parts of the same *Worm*, or of different. But this is undeniable, that this *Worm* is vastly Long, which plainly appears, even by those pieces we see of them; for besides the Instances mention'd by several Authors, I have a piece of one by me of a great Length, Voided by a Young Man about 20 Years of Age, upon the Use of an Emulsion of the Cold Seeds. He drag'd it from himself, not without some frightful Apprehensions, that Guts and all were coming out; he plainly perceiv'd it alive, and to move; and having put it into a wide mouth'd Glass, it often endeavour'd by raising its Body, to get out; but the Cold Water, into which it was put afterwards, soon kill'd it. I measur'd it, and found it 24 Foot long. In it I number'd 507 *Joints*. Its Colour was extream *White*, being Turgid with Chyle; its Body *Flat*, about the thickness of Half a Crown, where thickest; and the *Joints* towards the *Tail* about $\frac{1}{4}$ of an Inch broad; those toward the *Head* about $\frac{1}{4}$ as broad as those toward the *Tail*; and here the *Joints* were not $\frac{1}{4}$ of an Inch long, whereas those at the *Tail* were of a full Inch long, and something more, and from the *Head* they seem'd gradually to increase in length. The *Joints* much of a wideness throughout; and the Jetting Edges of the former over the latter usually Plain and Even; unless where the Contraction of the Body had rendred them a little Crimped. The *Flats* of both sides, just alike; and without any Spots, Protuberances, or any thing remarkable, which might distinguish them, or to be observ'd, only a smooth Superfice; but above the Middle of the Edges of each *Joint* I observ'd a protuberating *Orifice*, which would easily enough admit of a Hog's Bristle, and was open and apparent to the naked Eye. These *Orifices* were placed for the most part alternately in one *Joint* on the Right side, in the following on the Left. But sometimes I have observ'd them in 2, more seldom in 3 succeeding *Joints* of the same side; but never in one *Joint* more than once. These *Orifices* I take at present for so many *Mouths*.

But since I have here mention'd of what *Length* they have been observ'd in Man, I shall also add how *Long* those were I have seen in *Dogs*. For tho' they are to be met with only in the Animal Kingdom, yet in abundance of the Subjects of this, and those too of different Species; they are very frequent in *Fishes*, as in Pikes, Whittings, Bleaks, Crabs, Herrings, &c. and upon this score sometimes they prove a great Damage to the Merchants, as *Platerus* observes, they being forced to sling them away; In *Bleaks*, in Summer-time, if you open those that Leap and Tumble in the Water, from the Torment they feel within, you shall almost constantly meet with this *Worm*. In *Oxen* often they are observ'd likewise; not so much in *Calves*; in *Dogs* very frequently. I have oftentimes found them here myself in Dissection. I met the first time with two; there was indeed another piece, which I take only as broken off from one of the former, because here both *Extremes* were pretty large, and the *Joints* throughout proportionably long. But in the two others the Disproportion was very remarkable; For besides observing here their *Heads* *Hispid*, or thick beset with Hairs or small Spikes (which I shall afterwards describe) I took notice that

Obs. l. 4.

this *Extreme*, if extended, was very slender, and when a little contracted, the *Joints* so very small, that they were scarce discernable by the naked Eye; but where I could better distinguish them, between 30 or 40 made the length of an Inch; but towards the other *Extreme* or *Tail*, in one four, in the other 6 or 7 *Joints* made that length. One of these *Worms* was scarce a Foot long, the other not a Foot and a half. In another Dog, I afterwards dissected, I found another *Worm* with just the same *Head*, but about 5 Foot long; towards the *Head* in this 60 *Joints* scarce made an Inch, but at the *Tail* about 3 did equal that Space; and the *Joints* here were about a Quarter of an Inch broad; and in the Sides of the *Joints* in this I plainly perceiv'd those *Orifices*, I at present call the *Mouths*.

5. The *Head* of this *Worm* is *Obscure*, and has created many Controversies amongst the Curious *Anatomists*; who yet have been forc'd to confess, after observing vast Quantities of this *Worm*, that they are still at a Loss, and know nothing certain of it. But what I have observ'd of the *Head* of this *Worm*, in 3 several Ones I have taken out of the Bodies of Dogs upon Dissection, where I know I have them whole, makes me to be something more at a Certainty. I open'd a Dog at the Colledge of Physicians, and found a *Worm* alive in the *Ileon*; not lying straight, but in many Places winding, and doubling. Having taken Notice how the *Joints* were, I trac'd it up, by carefully opening the *Intestine*, to the smallest Extream, where I expected the *Head* to be; and which did lie towards the *Duodenum*, whereas the broader End was downward towards the *Rectum*; and this broad End was free, and did nothing adhere, whereas that Smaller *Extreme* did so firmly stick, and had fasten'd itself to the inward Coat of the *Intestines*, that it was not without some Trouble, by gently raising it with my Nail, that I freed it from its Adhesion. Having lifted it up, I carefully view'd it; and did observe neither that *Biceps*, in *Tulpius's* first Figure, nor the *Head* like a *Tricoccus*, as in *Mich. Febr.* but a very slender Body, which being alive it would sometimes shoot out a considerable Length, at others, retract it in again, and so very much alter its Figure, by becoming broader. But whilst I was doing this, by its wriggling its Body, it happening to fall off my Finger, it presently took hold again, and gave me as much trouble to free a second Time from its Adhesion, as at the first. I put it for the present into the Spirit of Wine, that I might more carefully view it with a *Misroscope* at Home: And in doing this, making use of some extraordinary good Ones, it very plainly appear'd, as is represented in the 20 Figure, thick beset with two Orders of Spikes, or Hooks, whereof the larger did arise from the Center or Middle, spreading themselves over the Edges of the Circumference; the other, which were lesser, issuing out about the Middle from the Center, and were shorter, as is seen in this Figure, and are represented sideways in the 21. I could not upon my strictest Enquiry, and with extraordinary Glasses too, inform myself of any *Orifice* here, which we may suppose to be the *Mouth*; only a little Indenting there was in the Center, occasion'd by the issuing out of the Spikes thence. This End was not perfectly Flat, but a little Globus; and I could perceive by the Swelling a little

Fig. 20.

Fig. 21.

little below on the *Neck*, and wrinckling of the Skin, as in the *Figures*, how it did shoot out, and contract its *Neck*, as I observ'd it when alive. For some little space here, I could not observe with the Glasses, any *Joynts* at all; but after, very thick set, and small, and gradually increasing in Length, as they descended towards the *Tail*. The *Heads* of the other two *Worms* exactly appear'd the same in the *Microscope*, as this describ'd; and afterwards, by carefully viewing them by my naked Eye, I could observe these *Hairs* or *Spikes*.

It was objected by some Ingenious Persons, Whether these *Spikes* or *Hairs*, might not be like the small Feet of the *Tick* or *Ricinus*, for its fastening-itself the better to help its Suction. And indeed, were it Blood it liv'd upon, the Case were plain; but since 'tis *Chyle*, what Service they could do it in this, I do not see; for when they fasten, the *Head* is deep immerg'd in the inner Coat of the *Intestine*, and so may be thought for that time to get but a very inconsiderable Scoop, if any; and nothing in proportion to what is requisite for so vast a long Body, and what it is often observ'd to be Turgid with. Upon the whole, what seems most agreeable to me, and to be the true Use of this Part, we call the *Head*, is this; that by the Means of these *Hooks*, and *Spikes*, it might fasten itself, and so prevent its too easy Ejection out of the Body. For it being so very long and large too and its Body in many Places Winding, and Convolutd, the Descent of the *Feces* upon all Occasions would be apt to carry it out with them, had it not this Hold; which is so fast, that rather than loosen itself, Parts of the Body are sooner broken off, which we frequently see in the Stool. When it penetrates the Coat of the *Intestine*, it contracts its *Hooks* in, and draws up its *Head* to a Point; then expands them, and takes firm hold of the *Membrane*, by darting its several Poniards into it; which excites those intolerable *Pains*, which those that are troubled with them, to much complain of, that I have known it to that Extremity, that some have been scarce dissuaded from offering Violence to themselves, to free themselves, as they thought, from a great Misery; and hence it is that this *Worm* is so difficult a Cure, that tho' by Medicines and Purges vast Quantities at times may be brought away, yet some can hardly get perfect Cure all their Life-time; as I know of one for above 20 Years has been afflicted with it, that had the Advice of several Able and Eminent Physicians.

6. But since in this *Head* we find no *Mouth*, we must seek it some where else, I am very sensible with how great Difficulty my present Thoughts concerning this will be receiv'd, and how obvious to all 'twill be to raise Objections. But if what I here offer be true, others will find it likewise; if not, I shall not think myself oblig'd to believe it. Why at present I think those *Orifices* in every *Joynt* to be so many *Mouths*, I shall now give my Reasons. I have already observ'd them to be of two Sorts; that in several *Worms*, both from Humane Bodies as also in those of Brute Animals, they are placed much about the Middle of the *Joynts* on the Edges; most frequently alternately, in one *Joynt* on the Right Hand, in the other on the Left; sometimes in two, seldom in more, on the same Side;

Fig. 19.

Side; they are Protuberant, something like a *Papilla*, and in the Middle a *Foramen* easily enough to be perceiv'd by the naked Eye, and will readily admit a Hog's Bristle. In the other Sort, these Protuberances are plac'd about the Middle of the Flat of the *Worm*, toward the upper Part of the *Joynt*, and seem to be represented by *Spigelius*, *Sennertus*, and *Tulpius* in their Figures of this *Worm*, tho' with some Mistakes; and is that, which Authors mean by their *Macula Nigricantes* in their Descriptions of it.

I shall here chiefly insist upon the former Sort, which has occur'd most commonly to me; and a short Black Line here, plac'd transverse to the Body, I think was the first that gave me Notice of them: Tho' since, in others I have not so constantly seen it, but only a Protuberant Orifice about the Middle of the Edges of the *Joynts*. That these are so many *Mouths*, I shall argue *First*, from the great Quantity of *Chyle* they are often Turgid with. *Secondly*, From the great Appetite, but more often Thirst, and almost always that Emmaciation which they occasion. *Thirdly*, That there is no other *Mouth* besides observ'd. *Fourthly*, That no Uses can so fitly be assign'd to these *Orifices* as their being *Mouths*.

As to the *First*, None, who have observ'd them, but must confess that they are often very Turgid; as that I have by me 8 Yards long, at first did very plainly appear; and having put it into Spirit of Wine, I found after a little while it had muddy'd it, by Spewing out a large Quantity of a Chylous Juice; which made a deep Sediment at the Bottom, as likewise it did a second time, having chang'd the Old, and put it in fresh Spirits. Whence all this should issue I cannot see, but by these *Orifices* at the Sides; which first I suppose had receiv'd, and lick'd it in. And being in so large a Quantity, how otherwise could it be well receiv'd into the Body, but by these many *Mouths*; which being always open, and lying of all sides too, do greedily exhaust, and devour the best part of the *Chyle*, and Nutritious Aliment. 2. That hence may be well accounted for, that *Appetitus Caninus*, that great Thirst, that *Atrophy*, I mention'd in my *Second* particular, and are often observ'd in those, that are afflicted with this *Worm*. But had they but one *Mouth* how could they do this? But having as many, it may be, as the *Lacteals* themselves, 'tis no wonder that they rob them, and by their nimble sucking it up, prevent its passing into them. That thence we must necessarily expect an Extenuation of our own Bodies, in proportion to the Increase of theirs; since the Nourishment we receive is but what they leave us; and that too none of the best; and corrupted likewise with their Re-crements. 3. I Argue, that these *Orifices* are so many *Mouths*, for if we do not admit them to be such, I know not where in the whole Body to find them besides. For in that part we call the *Head*, even our *Microscopes*, as I have observ'd, cannot discover any; and those too, that guessed it to be there, they all acknowledged it to be very small; and it being so, and but single too, I cannot see how it can take in so great a quantity of *Chyle*, which would be necessary for maintaining so great a Body, of so great a Length: For it can lick up no more than what just comes in its way; so that the open *Mouths* of the numerous *Lacteals*, would be too hard for it, and quickly

quickly starve it. Besides, since it nuzzles its *Head* so deep in the Coats of the *Intestines*, at that Time at least, it may be thought incapable of getting scarce any Thing at all. But the *Use* I have assign'd that Part, I am apt to think, will satisfy others, as well as at present it does myself. Therefore, 4. Why I think those Orifices *Mouths* is, because I cannot think what they are besides. For to take them for so many Vents of their Excrement would be more unreasonable, since 'tis pure *Chyle* which they receive; which will not afford much, at least so gross an Excrement, as to need so many and large Orifices for the voiding it. And why so many *Anus's* when but one *Mouth*? 'Tis easier to imagine them *Bronchia*, or *Lungs*; which in *Insects* are observ'd in all the *Annuli*, or *Joints* of the Body; but withall I must observe, with how much Difference from our Subject. For in them you shall constantly see these *Orifices* of both Sides in each *Annulus*, but in our *Worm*, never but of one side; in those, they are not near so open, and so large, as in this *Worm*, even so much, that I cannot see how it can be avoided, but that the *Chyle* must slip into them, and so spoil them for being *Lungs*; and indeed, what *Use* can we imagine of such here, which must almost constantly be occluded, either by Filth or *Chyle*. If I misremember not, by pressing them gently with my Fingers when fresh, and turgid, I observ'd *Chyle* to issue out of them. So that I think I have little Reason to doubt, that the *Chylous* Sediment in the Spirit of Wine, I had immerg'd them into, came hence. Upon the whole, what I have here offer'd, I think, is sufficient to render my conjecture probable. And yet I have more Reasons to add why these *Orifices* should be *Mouths*; because the *Joints* when broken off, yet still do Live, and that too, as may be thought, for some considerable Time; which they could not, unless they had *Mouths* in each, which might receive the Aliment for the Support of it. Which bring me to the last Particular I propos'd, for Discriminating this *Worm* from all others out of the Body, and shall now Discourse of.

7. It has been stiffly maintain'd by Authors of great Note, both Modern as well as the Antients, That the *Worm* itself scarce *Lives*; and is only a *Spolum* of the *Intestine*, or at least, it is not One, but many *Worms*, included in that Membrane. But such Opinions seem wide of the Truth: For many Physicians have observ'd it to *Move*, and therefore to be an Animal and *Alive*. And a remarkable Instance I had of it, in that I met with upon Dissection of a Dog in the Theatre of our Colledge; where I particularly observ'd the manner how it perform'd its *Motion*, which was very pleasing, and in different Forms. For though all was perform'd by Contracting and shortning the *Joints*; yet sometimes it rendred the Body, that was Flat, Round and a *Cylinder*; other Times it made a deep Hollow or Concave on one side, and a Convex on the other; but most Times there was a Belying out at the Edges, about the Middle of the *Joints*; and tho' that Part towards the *Head* was very Slender, yet upon Contraction it would become as Broad as the last *Joints*. This Contraction of the *Joints* I sometimes observ'd, at several Places at the same Time at some Distance from one another; which must needs much advantage its Progressive Motion;

tion ; since being of so great a Length, otherwise It could make but small advance ; which is perhaps requisite, that it may recover itself, when the Descent of the *Fæces* do drive it downwards. And for the Advantage too of its *Motion* ; at every *Foynt* there is a Prominence of the former over the latter ; which like so many Scales on the Belly of other *Reptiles*, do perform the Use of Feet.

De Lumb. Com-
ment. n. 3. p. m.
34.

But I find some Authors, who admit this *Worm* to be *Alive*, yet assert that 'tis not One, but many *Worms* link'd together and included in a *Spolium* of the *Intestines*, and that this *Spolium* itself is not *Animated*, but receives all its Sense and Motion from the *Cucurbitini* included in it. This *Gabucinus* very plainly, as he tells us, discover'd in a Part of this *Worm*, shew'd him by a Person that Voided it. *Hæc Portio* (says he) *jese commovebat, quo factum est, ut avidius Motes ipsius causam vestigarum, diligentissime tandem perquirens per ejus totam Cavitatem, Cucumeris similium Animalium Seriem jese moventium ipsi Motum præstare conspexi : Quæ ex ea, veluti ex quodam Lectulo, prodibant, interdum unum, duo simul interdum complicata, plerumque quatuor plurave : atque eam abrasionis portionem, quæ vacua ab hujusmodi Cucurbitinis segmentis Animatis erat, nullo pacti moveri, imo subsidere* But I very much suspect this particular, because in that I met with in a Dog in the Colledge Theatre whilst *Alive*, and in my Hand, a *Foynt* or two fell off, but I could no ways observe any Membrane hanging to the foregoing *Foynt*, out of which it might slip, but it broke off entire. And altho' there were two single *Foynts*, which I found in the *Intestine*, upon the first opening it, yet there was nothing I could see affix'd to the last which might include them. And indeed the setting on of the *Foynts* here is such, that it seems to me sufficient to shew. That this *Worm* cannot be a continu'd Membrane articulated only by the several *Cucurbitini* included in it, since there is so large a Protuberance of the Lower Extream of the foregoing *Foynt*, over the Upper Part of the following ; which I plainly perceiv'd in this *Worm*. If only a Membrane, why constantly, and thus regularly, a difference of both *Extremes*, as to their Length and Breadth ? How happen the *Hooks* at the Head ? How are those *Orifices* form'd at the Edges, or on the Flat of the *Worm* ? And if it was so as *Gabucinus* imagin'd, I cannot but think I must have perceiv'd something of it, in those several pieces of this *Worm* which I have observ'd ; and especially in that 8 Yards long, where I open'd several *Foynts*, and could find no such thing. That *Mucous* Matter therefore which is observ'd to be Voided by those troubled with them, which he tells us the Women there take for the Beds of this *Worm*, may be better accounted for ; it being likely in a great Measure to be but the *Mucus* of the *Intestines* themselves, or a Slimy *Spolium* cast off from these *Worms*. Thus Leeches I have observ'd, being put into Water, do cast out a Slime, which covers their Bodies, which afterwards they slip off, and is found in the Bottom of the Glass in the Form of a Mucous Coat. So Earth-Worms do void a large Quantity of a Mucous-Liquor, at several Parts of their Body ; so Snails, &c. upon the whole, I see nothing why we may not justly ascribe that *Life*, we find here, to the *Lumbricus Latius* itself, and not to any Animals we may fancy it pregnant with.

And

And what I do give to the whole, I must attribute likewise to the several Parts of it, even when separated from the rest of the Body ; and can't but think that they do *Live* likewise. For, besides those Considerations I have already deliver'd, to prove that in every *Joynt* there is a *Mouth* for receiving the Food, (and no doubt answerable *Organs* for the *Digestion* and Distribution of it,) I have also observ'd that both Single *Joynts*, and often larger Pieces have been voided *Alive*; and where vast Quantities of this *Worm* too have been Voided at the same time, in abundance of Pieces I have observ'd them almost equally turgid, and alike fill'd with *Chyle* in Proportion to the Magnitude of the Parts. Now I cannot think that in Voiding, it can always be broken into so many Pieces; and if it be done some time before, and they lie dead in the Body, they must be emacipated, and different from what they appear. But that Observation I have already often mention'd, of that *Worm* I met with in the Dog I Dissected in the *College Theatre*, does furnish me with something apposite to our Purpose. For here, about the Middle of the *Worm*, as it lay in the *Intestine*, about a Foot and a half from the *Tail*, or Lower Extream, I observ'd two Single *Joynts*, about $\frac{1}{4}$ of an Inch long, *Alive*, and which continu'd their Motion briskly for $\frac{1}{4}$ of an Hour, or more, in Warm Water. That these were broke off from the *Tail*, I nothing question, being in all Respects so like them; and that it must be done sometime before, I am apt to think, because they were so remote from it. For they could not otherwise easily, being but Single *Joynts*, make so great an Advance, being upon all Occasions liable rather to be driven down, not being able as I could observe any ways to fasten themselves, and so resist the Force of the descending *Fæces*. Which is the Reason, when broken off, they are so frequently voided.

Upon the Whole, I have been sometimes apt to think, what Analogy there may be between this *Joynted Worm* and *Knotted Plants*; of which each *Joynt* can so easily propagate itself. And whether it may not be thought an *Animal*, *Plant Animal*, or *Zoophyton*, bred in *Animal Bodies*; since so large and frequent Detruncations of the Body do not destroy the Life of the Whole; Which I think can scarce be Instanced in any *Animal* besides.

Figure 16. Represents a *Worm*, or rather Part of a *Worm*, voided by a Young Man in *London*; which was 8 Yards long. The lesser Extream, is that Part towards the *Head*; the broader the *Tail*. The Protuberances, about the Middle of the Edges of the *Joynts*, are the Orifices I take for *Mouths*.

Explication of
the Figures.

Fig. 17. A *Worm* I took out of a Dog, which was about 5 Foot long; and was *Alive*. The small End shews the *Head*; as it appear'd then to the naked Eye. The two Protuberances at the Sides, are the *Mouths*. The broad End the *Tail*.

Fig. 18. I met with this Figure in *Franc. Sanchez*, which tho' rude and plain, yet very well represents those Orifices, which I take for the several *Mouths* of this *Worm*.

Fig. 19. Represents the Protuberance or *Papilla* about the Middle of the Edges, (as view'd with a *Microscope*), and in it the Orifice which I take for the *Mouth* of this *Worm*.

Fig. 20. Is the *Head* of this *Worm* (as it appear'd in the *Microscope*) in several Ones I took out of the Body, upon Dissection; wherein is observable a double Order of *Spikes* or *Hooks*, the Longer arising from the Center, the other more towards the Edges, which at pleasure it can contract or protrude; and with them, part of the Neck too, as does appear by the Swelling out a little below, as it is very curiously delineated (as likewise the other *Figures*) by *Rich. Waller, Esq*;

Fig. 2. A Side-Prospect of the *Head*, and the *Hooks* in it, of the same *Worm*.

The Lumbricus
Teres; by Dr.
Edw. Tyson. n.
147. p. 154.

XL. That common *Round Worm*, which Children usually are troubled with, is by *Hippocrates* nam'd *σενγυά*; by *Celsus*, *Teres*. It is usually about a Foot long; but the *Male* is generally lesser than the *Female*: So that by their Bigness in the same Body, I have before Dissection been able to distinguish the Sex. They are about the Bigness of a Wheat Straw, or a Goose Quill, and their Colour White. I did not observe those *Feet*, or *Asperities* on the *Annuli*, as in the *Earth Worm*. At both Extrems they grow narrow. Their *Mouth* is composed of three Lips; so the *Leech* hath 3 Cartilaginous Teeth set in a Triangle, by which they make the Wound in the Skin in Suction. The *Anus* is a Transverse Slit a little before the Extream Point of the *Tail*.

In opening the Body, I found I cut thorough a large *Muscle* under the Skin: Which *Muscle* in *Earth-Worms* I find is Spiral; as in a good Measure is their Motion likewise; so that by this Means, like the Worm of an Augre, they can the better bore their Passage into the Earth. Their Reptile Motion also may be explain'd by a Wire wound on a Cylinder, which when slip'd off, and one End extended and held fast, will bring the the other nearer it. So the *Earth Worm* having shot out, or extended his Body, (which is with a Wreathing) it takes hold by those small *Feet* it hath, and so Contracts the hinder Parts of its Body. Likewise I observed, that dividing this Part, there issu'd out a copious *Ichor*; which is naturally discharg'd by some Pores; or small Vents, in the Skin; which in the *Earth Worm* is of great Use, by rendring the Surface of the Body slippery, that so it might the more easily glide into the Earth. And in these other *Worms* of the *Intestines*, this Humour (as in *Leeches*) makes a Covering to the Body, which is often cast off, and observ'd as a *Mucus* in the Stools of those troubled with them.

In these *Terebrators* of Animal Bodies, I never observ'd those transverse *Diaphragms* which are so numerous in *Earth-Worms*, and do intersect, or rather so deeply depress, the *Intestine*. The Passage from the *Mouth* was somewhat straightned for a short Space, and was distinguish'd, as in the

Fig. 22, 23.

Figures, from the following *Ductus*; which was a straight *Intestine* continu'd to the End of the Body, without any Winding or other Distinction of a Stomach, that I could observe. In the *Male* I observ'd a *Penis*, a

Vesicula

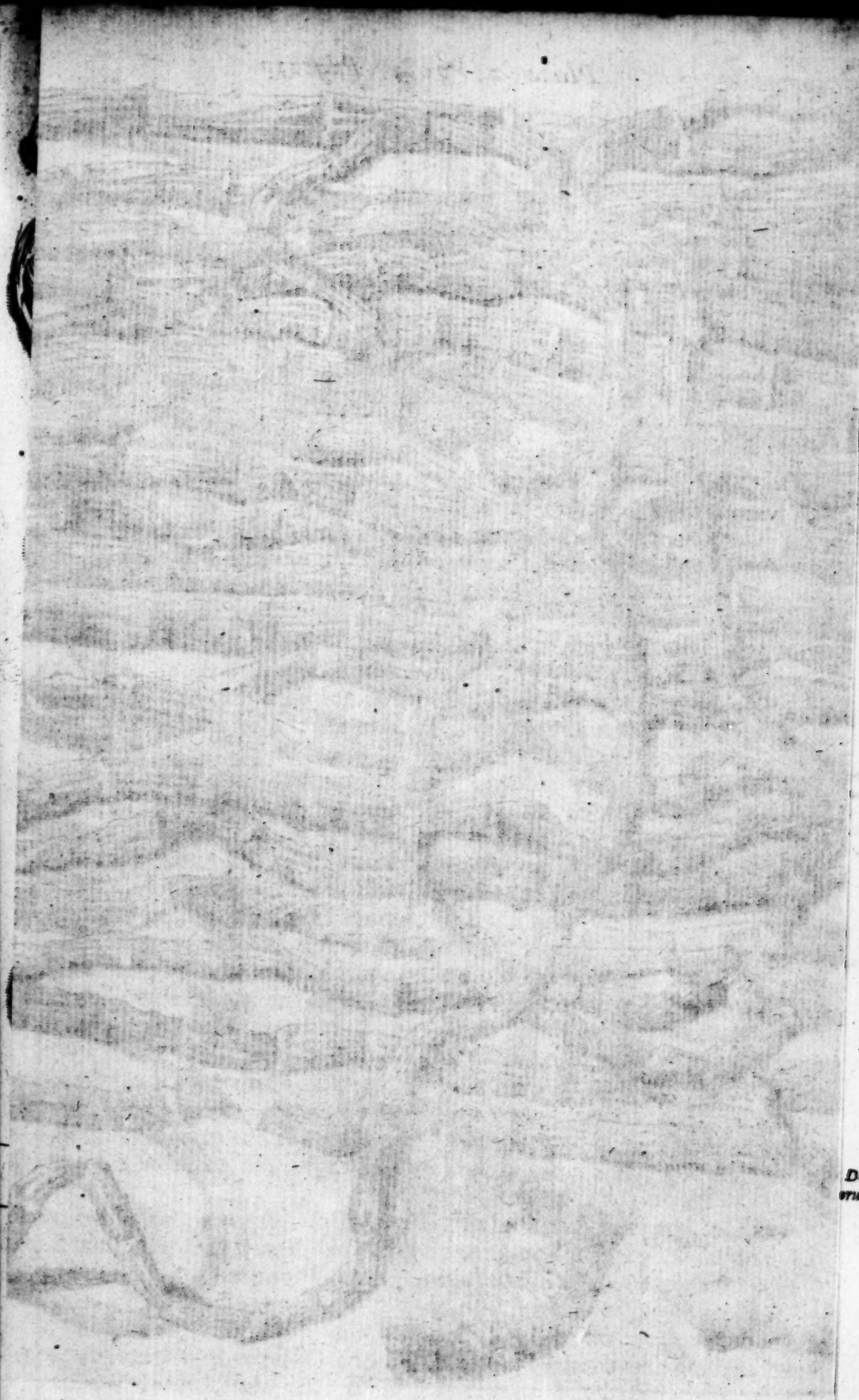


Fig. 25.

De Anima Bru-
orum, c. 3.

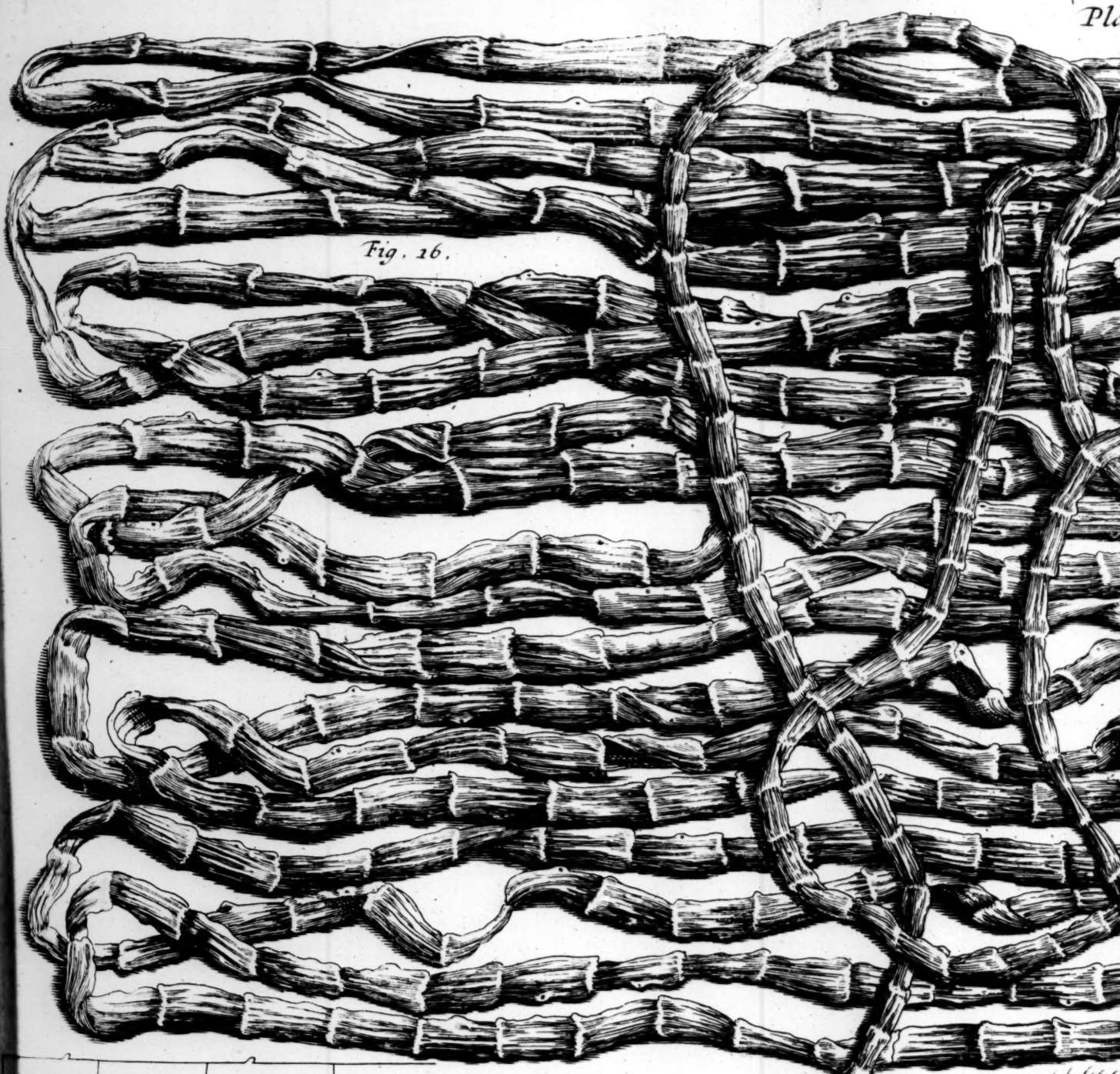


Fig. 16.

Fig. 18.

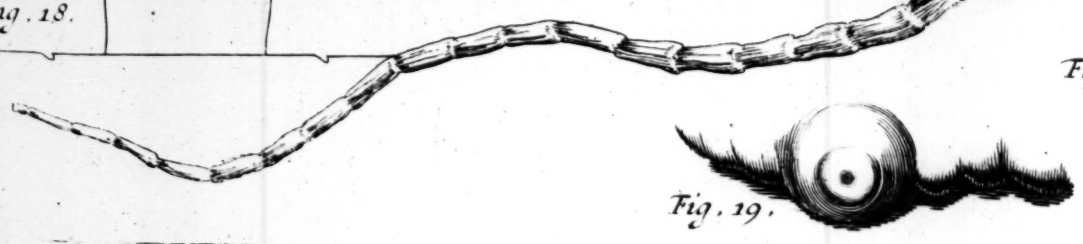


Fig. 19.

Fig. 21.





Fig. 20.



Fig. 17.

The Lumbricu
Teres ; *by Dr*
Edw. Tyfon. n.
147. p. 154.

Fig. 22, 23.

Vascula Seminalis, and a *Testis*: In the *Female* a *Pudendum*, *Vagina Uteri*, *Cornua Uteri*, and *Spermatick Vessels*.

In the *Male*, the *Penis* was plac'd at the *Tail*, or opposite Extream to the *Head*; and seem'd to be able to exert itself almost the length of a Barley-corn, or proportionably to the length of the *Vagina* in the *Female*. At the Root of the *Penis* was inserted the Neck of the *Vesicula Seminalis*, which gradually grew larger as it ascended in the Body, and usually did reach almost half way. 'Twas fill'd and turgid with a *Milky Juice*, which it receiv'd from a slender *Vessel* of the same Colour inserted into it; which after one turning, was afterward very much Convoluted, and being so, forms that Body I call the *Testis*. And altho' this Part be so loosely contex'd, as even to the naked Eye it appears but a continu'd *Vessel*, and may easily be unravell'd its whole length, which I measur'd was above a Yard: Yet I make no Difficulty of giving it the Name of a *Testis*, since 'tis now sufficiently known, that the *Testes* in more compleat Animals are only a *Congeries* of *Vessels*. And a *Rat*, besides this *Worm*, is not the only Subject wherein I have found them thus loose and easily separable.

In the *Female-Worm*, almost about the Middle of the Body, but more towards the *Head*, I observ'd an Orifice or *Pudendum*, which led into the *Vagina Uteri*; which soon divided into the two *Cornua*, which were large and remarkable: For descending something winding towards the *Tail*, they were then reflected again, and did each of them terminate in slender *Vessels*, White as they were, but much smaller; and did lie in several Convolutions and Windings amongst them. These I take for *Spermatick Vessels*. Having taken those *Vessels*, with the *Cornua Uteri* and *Vagina*, out of the Body, and laid them on a Paper to dry, I found from each *Cornu* to the End of the *Spermatick Vessels*, which I had preserv'd, that they measur'd above 4 Foot. I open'd the *Cornua Uteri*, and found them Turgid with a *Milky Juice*: Having plac'd a little of it upon a small *Microscope*, I plainly perceiv'd 'twas nothing else but an infinite Number of small *Eggs*, tho' to the naked Eye it appear'd only as a fluid Body. These *Eggs*, when fresh, appear'd as is represented in the *Figure*, cover'd with Abundance of small *Asperities*; but as they grew dry their Surface appear'd Smooth. By comparing that small Quantity I did observe, in which I could distinguish so many *Eggs*, with the whole Substance contain'd in both the *Cornua*, I cannot guess there can be so few as 10000 *Eggs* in each *Female-Worm*.

Fig. 25.

How far differents this *Worm* is from common *Earth-Worms*, as to these Parts, I need only refer to Dr. *Willis's* Figures and Account of it to shew: And I am yet to learn what *Worm* out of the Body has these Organs thus form'd. When once there, the Case is plain how they propagate themselves, since the Distinction of *Sexes* is so evident: So that they are much mistaken who say, that these *Worms* do not Generate. And I cannot but think, that they are also mistaken who make them *Viviparous*; and that they were impos'd upon by the *Genital Parts* of this *Worm*; which not warily examin'd, might easily make them to think they are so many small

De Anima Bru-
torum. c. 3.

Worms. For they are not *Viviparous* but *Oviparous*, as I have shewn; and their containing so vast a Number of *Eggs* in the *Cornua Uteri*, as I have express'd, does sufficiently account for that prodigious Quantity, that are sometimes observ'd to be bred in Animal Bodies. And were it not that the greatest Part of the Litter of this *Worm* is usually carry'd forth by the *Fæces*, it could not be avoided but we should be devour'd by such a *Multiparous* Enemy, which we breed in our own Bowels. That Caution therefore of *Henr. ab Heers*, I think is necessary; to avoid the giving the Powder of these Worms for expelling others, since we cannot be secure, but that at the same Time we may sow the Seed for Propagating more.

Phil. Medic. l. 1.
Obs. 9.

Explication of
the Figures.

Fig. 22. Represents a *Male-Worm* open'd. *a*, Shews the 3 *Lips* of the Worm. *b*, The *Oesophagus*, or Gullet. *c c c*, The large *Intestine*. *d*, The *Penis*. *e e*, The *Vesicula Seminalis*. *f*, The *Testis*.

Fig. 23. A *Female-Worm* open'd. *a*, The Mouth. *b*, The Gullet. *c c c*, The *Intestine*, or Gut. *d d d d*, The two *Cornua Uteri*. *e*, The *Vagina Uteri*. *f f f*, The *Spermatick Vessels*. *g*, The *Anus*.

Fig. 24. The *Genital Parts* of the *Female Worm* Explicated. *a*, The *Pudendum*, or *Foramen*, as it appears on the out side of the Skin. *b*, The *Vagina Uteri*. *c c*, The two *Cornua Uteri*. *d d*, The *Spermatick Vessels*.

Fig. 25. The *Eggs* of this Worm, as they appear'd being view'd by the *Microscope*.

Lumbrici Teretes found in an Ulcerated Ankle; by Dr. M. Lister. n. 95. p. 6064.

XLI. In Apr. 1673. A Chirurgeon at York brought me about 20 Worms, which he had just taken out of an Ulcerated Ankle of a Girl of about 8 Years Old. She had been in great Misery for some Months; and had been sent up to London, where she was Touch'd and Dress'd for the Evil. Some Time after her Return, her Pain continuing, a young Puppy was open'd and apply'd to the Sores. The Chirurgeon, who took off the Puppy, found it, to his great Admiration, full of Worms, at least 60 in Number, what those he found in the Body of the Puppy, and what he drew out of the Sore Ankle; into which, he said, they crawled down as Worms do into the Ground. The same Puppy was again apply'd, and at the second taking it off I made her a Visit. I found the Leg sound all but the Ankle, which was vastly Swell'd, and the Girl otherwise Hearty and well-colour'd. I saw only one Worm got out into the Puppy, but a very Live and Stirring one: Many were afterwards kill'd by Injections. These Worms, I affirm, according to my best Knowledge; (and I had the Opportunity of comparing them) were of the very Species of the *Lumbrici Teretes*, which Children familiarly void from the Guts. They were betwixt 3 and 4 Inches long; all, about the matter, of an equal Bigness, as of one Brood; something thicker than a Duck's Quill; very sharp at both Ends, stiff, and exactly round; without Incisures, visible at least, and yet could Move and Twist themselves readily enough. All the Difference was in the Colour, these being much Whiter than any I have seen from the Guts.

XLI.

XLII. The Sugar or Remedy, given by *Pontaus* (a Famous Chibical Mountebank) for *Worms* in Children, is 15 Gr. of *Mercurius Dulcis*, with 5 Gr. of *Scamony*, or 2 or 3 times as much *Sugar*, made up in *Lozenges*.

He says, That this *Dose*, which in *France* Purges grown Persons, does nothing here in *England* to those above 15 Years Old, and ought to be augmented.

His *Mercurius Dulcis* is made without *Vitriol*, which though good, is yet Corrosive, he takes only *Ashes* with *Decrepitated Salt*.

XLIII. In the Dissection of a *Gazella*, or *Antelope*, brought from *Aleppo*, I observ'd several *Hydatides*, or Films fill'd with limpid Water, about the bigness of a Pidgeon's Egg, and Oval, which were fasten'd to the *Omentum*, and some in the *Pelvis* between the *Bladder of Urine* and the *Rectum*. I had before met with the like Watery Bags, or *Hydatides*, in other Animals, and I suspected them to be a particular Sort of Insect bred in Animal Bodies, or at least the Embryo's or Eggs of them: 1. Because I observ'd them included in an outward Membrane, like a *Matrix*, so loosely, that by opening it with my Fingers or a Knife, the inward *Bladder*, containing the *Lympha*, or *Serum*, seem'd no where to have any Connexion or Hold to it, but would very readily drop out, still holding its Liquor without spilling any of it. 2. I perceiv'd to this inward *Bladder* there was a Neck, or White Body, more Opake than the rest of the *Bladder*, and protuberant from it; but so as I could observe an Orifice at the Extream of it, which then to me seem'd to be occasion'd by the Retraction of some Part of it inwards. By this I fancy'd it might, as by a *Mouth*, suck the *Serum* from the outward Membrane, and so supply its *Bladder*, or *Stomach*. 3. Upon approaching this Neck to the Candle, we found that it did really move, and then shorten itself. Mr. *Rich. Waller* being present at the Dissection, made these Figures of it.

Fig. 26. Represents one of these Watery Bladders, inclos'd in its Outward Membrane or *Chorion*; its Shape was almost round, only Flatted as a Drop of Quicksilver will be by lying upon a Solid. *a*, Shews the Neck, seen through the Membrane, which in

Fig. 27. is more plainly Represented, (the outward Membrane being taken off) but as appearing to the naked Eye; where we may observe an open Orifice, at the Extream of it, and that is made up of Circular Rings, or Incisures, which in

Fig. 28. being view'd by a *Microscope*, do more evidently discover themselves. This Part is Granulated with an abundance of fine Eminencies all over. The Orifice at the End seems here to be occasion'd by drawing itself inwards, and upon Trial we found it so: For in

Fig. 29. is Represented the Neck of this *Worm*, drawn out its whole Length and Magnify'd: Where may be observ'd the lessening of the Rings, and its tending to a Point at the End. And having open'd it, within we found 2 small *Strings*, *a a*, proceeding from the Neck and floating in the Liquor.

What

A Remedy for
Worms in Chil-
dren; by Sir
Theodore May-
ern. n. 211.
p. 164.

The Lumbricus
Hydropicus; by
Dr. Edw. Tyson.
n. 193. p. 506.

Explication of
the Figures.

What these 2 *Strings* may be, is hard positively to assert: Leaving others to their own Conjectures, I shall deliver mine; That this *Worm*, by protruding its Neck, Sucks from the outward Membrane (which involves it, and is furnish'd with Blood Vessels) the Moisture, or Nourishment, which is convey'd by these 2 *Strings* or Pipes into the Stomach or Bladder, and from whence as there is occasion, it may be supply'd for the Nourishing the whole Body of the *Worm* again; for I am apt to believe, this Bladder is but the *Stomach* of the *Worm*, which will appear less unreasonable if we consider in some Insects how prodigiously large the *Stomach* is in proportion to the other Parts of the Body, in a *Leech* you may observe not a single but above 20 *Stomachs*, emptying out of one into another, and running the whole Length of the Body. And what *Malpighius* observes of the *Silk Worm*, that it would devour in one Day as much as the Weight of its whole Body, a *Leech* will do far more at a Meal.

De Bombice.
p. 49.

Some it may be will be more inclin'd to think, that the whole is but an Egg, or *Embryo* of another Insect, a forming, and that this Bladder is as it were the *Amnion*, and the outward Coat that includes it, the *Chorion*. But formerly in Dissecting a Rotten Sheep, wherein I found many of these *Hydatides*, and opening several of them, I could not observe but the same Structure exactly in all; and doubtless had they been indeed *Embryos*, I should have met with some nearer to Perfection. These *Hydatides* therefore I cannot but think are a sort of *Worms*, or Insects *sui Generis*, and because they contain so much Water in them, and are usually to be met with in Rotten Sheep, which are *Hydropical*; I call them *Lumbrici Hydropici*.

But I do not think that all those *Cysts*, to be met with in Morbid Bodies, are of this Sort. For in some I have not observ'd this Neck and Structure of Parts, but only a transparent Bladder fill'd with a *Lympha*. Thus about 10 Years ago, I open'd the Right side of a Patient, a little below her short Ribs, and there issu'd out abundance of Limpid Water, and together with it, a great many *Hydatides*; that first and last, as we guess'd, there might come out about 500 of these Bladders: most were entire and fill'd with Limpid Water; of others that were too large for the *Orifice*, the *Films* were broke; but in none of them could I observe the Neck, tho' I was inquisitive to find it; which makes me think them to be different from our present Subject. As are likewise those I have met with in the *Ovaria*, or Testicles of Women, who have dy'd *Hydropical*, which I take to be only the Eggs contain'd there, which by an extravagant Flux of Humours into them are often swell'd to that prodigious Bigness, that I have taken sometimes several Gallons of Liquor out of them. And those Bladders of Water found in the Urine Bladder of Mr. Smith of Highgate, will come into the same Number, having observ'd no Neck in any of them.

Vide Inf. Sect.
LVI.

I shall only add, That these *Lumbrici Hydropici*, I have always found hanging to the Membranous Parts, rather than included in the Body of any of the *Viscera*, as to the *Omentum Peritonæum*, or the outward Membranes that cover the *Diaphragme*, *Stomach*, *Liver*, *Colon*, or other *Intestines*.

XLIV 1. The *Worm*, when I voided it, which was at the second Urine, was then alive. It was Snake-headed, of indifferent Substance in the middle, and small at the Tail, in Length above half a Yard. I was very ill before it came from me, and have ever since Urin'd a kind of Blood.

A Worm voided by Urine; by Mr. Matthew Milford. n. 140. p. 1009.

2. 'Tis most probable that he had a Suppression of Urine for some time, at the first making whereof, the *Worm* was voided from one of the *Kidneys* (wherein it was bred) into the *Bladder*; and at the second, from thence into the Pot. It was (being dead and dry) of a dull Red Colour, and in Thickness about the 12th of an Inch.

By Mr. Ent. ib.

XLV. 1. A Girl in *Shiffeld*, about 8 Months old, was surpriz'd with violent Vomiting Fits, which held her for about a Week, and made her so weak, that her Parents began to despair of her Recovery. They at length sent for Mr. Fisher, who chanc'd to say, *Wormwood* was good for the Stomach. He going home to fetch Things proper on that Occasion, they, in the mean time offer'd her some *Wormwood-Ale*, which she took so greedily, that she swallow'd down a Pint of it. And at his return she Vomited up in his Presence 3 *Hexapodes*, all very active and nimble. The Girl, in a short time, recover'd, and was well. Mr. Fisher in the Afternoon, brought the *Hexapodes* to me; we kill'd one of them with trying Experiments upon it. But gave either of the other two the Head of a shining *Atricapilla*, which, in about 5 Weeks time they eat up Bones, Feathers, and all, except the Extremities of the Feathers and the Beaks. I then gave them a piece of *Larus*, but that it seems agreed not so well with them; for they dy'd within 2 Days.

Animals vomited by a Child at Sheffield; by Mr. Jessop. n. 117. p. 393.

2. A Son of Mr. B. not living far off *Rippon*, about 9 Years of Age, in Feb. 1673, was afflicted with great Pain in his Stomach, and continual Vomitings. A Powder was given him, wherein was a small Quantity of *Mercurius Dulcis*. He thereupon Vomited up several strange *Worms*, 2 of which were brought to me at *York*, the one dead, the other alive, and which liv'd many Days, till I put it into Spirit of Wine to preserve it in its true Shape. These *Worms* were very *Caterpillars* with 14 Legs, viz. 6 small, Pointed; the 8 middle, Stumps; and the 2 hind, Claspers; something more than an Inch long, and of the thickness of a Duck's Quill, thin Hair'd, or rather naked, with brown *Annuli*, and a Black Head; the very same, for Kind, that I have many times seen on Plants, and no doubt, these (as those others) would, in due time (if the Place had not hinder'd) have shrunk into *Chrysalis's*, and chang'd into *Moths*. As also those mention'd by Mr. *Jessop* would have chang'd to *Beetles*.

By a Child near Rippon; by Dr. Lister. ib. p. 394.

3. A Baker at *York*, in March 1681, Vomiting up a *Worm*. I found it in the Blood which came up with it, having caus'd it to be wash'd for the more careful Examination of it, much of the Blood being Clods of a kind of skinny and fleshy Substance, *haud aliter quam in Mulierum Molis excernendis accidere solet*. Of this kind of Blood there was about 2 Pound Weight sav'd in the washing, and this odd Animal amongst it. It was a dark Green Colour, like a Horse-Leech, and spotted not unlike some of them, I could perceive

By a Man at York; by Dr. M. Lister. Ph. Col. n. 6. p. 164.

Fig. 26.

perceive (when I found it) no Life or Motion it had; the Girl that wash'd the Blood having almost beaten off a Fin, and part of one of the Forks of the Tail, and burst the Belly of it; yet it was curiously and regularly shap'd in all its Members. The honest Man imagin'd he drank it the Summer before in Pond-Water, of which he was us'd to drink after sore Labour in his Calling. This is certain, he had about his Stomach and Right-side a most exquisite and tormenting Pain, for at least 4 Months, which many times threw him into Horrors and Chillness, Ague-like; and indeed when he Vomited this up, he was the sickest Man I ever saw not to dye: He also voided Blood by Stool several Days.

I am at a Loss where to place this Animal, for that it is not like any Thing I ever yet saw in Nature. It was about 4 Inches long, and in the thickest place 3 Inches about; it had 3 Finns of a Side, all near the Head, and all of them were Thick and Fleishy: But the fork'd Tail was Finny and Transparent, and to be extended; it was plac'd Horizontally, not as that of most (if not all) small Fish, and even *Neuts* and *Tadpoles*, or Frogs in disguise, in which Particular it differs from them all, as well as in the Fleishiness of the Finns.

Besides this Odd Animal, I found the Head of another of a different Shape, but of the like dark Green Colour.

I am apt to think that we often Drink and Eat what is Alive, and it is certain some Things will Live-on in our Stomachs in spite of Concoction; not to instance in the many Sorts of *Gut-Worms* natural to us, and which are bred within us, perhaps in some Children even before they are born; these *Worms*, I say, do freely wander up and down the Guts and Stomach at their Pleasure, and receive no Prejudice from the Concoctive Faculty of them. And for this Reason we see *Insectivorous Birds* so solicitous to kill *Worms*, and all other Sorts of *Insects*, by drawing them again and again through their Bills, as Canes through a Sugar-Mill, that they may be verily dead before they swallow them. And yet I am of the mind that what was accidentally swallow'd by us Alive, and that shall have the Power to Live on within (especially if it shall be young and tender, and yet growing) may have its design'd Form and Shape monstrously perverted, so as to appear to us quite another Thing than Naturally and really it is; and this I take to be the Case of this Odd Creature, which might have been the Spawn or *Embryo* of a *Toad* or *Neut*.

The Skinny Lumps of Blood, Vomited up with it, I think may be easily accounted for. For this Spawn or *Embryo* of a *Toad* or *Neut*, might well Venome the *Stomach* or *Gut*, in which Part soever or Wrinkle thereof it chanc'd first to rest or stick, and cause an Inflammation there, and so have itself swell'd, or clos'd up within a Tumour of its own making, which in process of Time might gather to this Bigness, and at length bursting in pieces, come up together. Familiar and infinite Instances of this Nature we see in *By-fruits*, or Wens, which *Insects* raise upon Vegetables; which by Natural Instinct know how to invenome a Plant, and so compendiously to provide both Food and Housing for their Young.

XLVI. The chief Cause of those rising Tumours fix'd upon my Tongue is at last discover'd to proceed from the Disease of Worms. *M. De la Croix* in his *Memoirs*, having mention'd some Cures of this Disease of Worms by one *Sarah Hastings*, who was very Famous in the Discovery of them in the Face, Gums, Tongue; and which she manag'd with such dexterous Art, in the Operation, that she took them out of any Part affected, with a Goose-Quill, one of which being in some respects like to my Case, I was the more curious and solicitous to enquire out if there were any of the Worm-Doctresses now in being; and hearing of one Famous at *Leicester*, I was resolv'd to write to her, describing all the Symptoms as plain as I could explain them; to which I had a return, That she believ'd my Disease to be Worms: And being resolv'd to try the Experiment, I took Coach for *Leicester*, where being come, my *Doctress* (*Mrs. French* by Name) no sooner inspected the Place, but instantly declar'd her Opinion, that the Distemper proceeded from Worms. The next Day she fell upon her Operation, which was perform'd in the Presence of two Aldermen of the Town, *Mr. Gibbs*, my Lord of *Derby's* Chaplain, and several others, when piercing the Parts affected with a Lancet, she drew some Blood, and soon after with a small Spatula, and another Instrument with which she open'd the Orifices, she pick'd out 5 or 6 Worms at a time, some of which I have here sent to you for your more curious Observation. She plainly shew'd them to the Spectators as they came out of the Flesh; they were all alive, and mov'd their Heads, somewhat lesser than ordinary Maggots. I can tell you, that in less than 8 Days she took out of my Tongue more than an Hundred Worms, all almost of the same bigness, except two very large ones, which (she told me) were of a *Cankerous* Production: She took more than 30 out of my Gums, which last Operation is her ordinary or daily Practice; Persons of good Note resorting to her from all Parts of the Country thereabouts. I was very curious to enquire out what Cures she had done of this Nature; and I found a very satisfactory Account from Persons of some Quality and Note. And to be short, though the Operation was very surprizing, and so will (I suppose) seem to you Incredible; yet neither I, nor any one present could discover any Fallacy, but all the plain Dealing that Ocular Demonstration can admit of, to prove the Reality of the Operation; which I myself saw her perform upon several Patients while I was at *Leicester*. I shall not enter upon a Philosophical Reasoning about the Nature or Production of these Animals: But I think the Cures this Woman performs in picking out these Worms from all Putrefactive Ulcers, Tumours, and Sores, whether in the Faces, Noses, Gums, or Tongues of several Persons, prove that such Animals are Generated in those Parts. I have receiv'd some sensible Good, and hope to have more Relief by her next Operation.

2. She put the Case beyond all Dispute; (1.) By shewing me the Head of the Worm in the Orifice before she extracted it. (2.) He was still sensible of their approach before she could see them. (3.) She design'd, what he intended to have done, that an Incision shall, when he comes to Town,

Vol. III.

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*An Account of
Worms found in
several Parts of
the Body; by Mr.
Tho. Dent. n.
213. p. 213.*

*Mem. for the
Ingenious. July.
1693.*

*Further Com:
firm'd; by Mr.
Mary Lewis. 1b.
P. 222.*

be

be made in the Place, that if Worms be not then found, she may then be well spoken of.

To me she gave a Catalogue of several Cures she had done in the Town and Country, one was my own Relation, I know to be a Truth.

Thus far we went over Night, she took 15 or 16 Worms out next Morning. I found Mr. *Newton* desirous to see the Operation, he was a Stranger to us both; but we comply'd with his Desire, were extream glad of his Company, when he told us it was on your Account.

He took the same Care I had done, saw the same Effects I had done over Night, only now there was not above 10 Worms; they came by two at a time, once as I remember three.

I design'd to have sent you some to compare with yours; I told her of the Fraud my Friend, Mr. *Pepple*, had detected in the *Stamford Woman*.

I had provided some soft Cotton in a small Box, but why, I know not, they now all dy'd the same Day before I was got home, when as formerly I had kept them 14 or 15 Days; they had Fasted 3 Days before I had them.

I had the Curiosity to try whether I could find any Blood in them, but did not; which makes me think they feed of the same Humour they are bred of.

*The Long-worm
in the Flesh in the
East-Indies; by
..... n. 225.
p. 417.*

XLVII. A few Days after my Arrival at *Fort St. George* in the *East-Indies*, the Fruits of my *Gomgroon* Journey shew'd themselves; for a little below the Instep of my Left Foot, a Worm put out his Head, which afterwards cost me much Trouble. These Worms are bred by the Water, between *Gomgroon* and *Scbiraz*, especially that about *Laur*; they come out in any Part of the Body, and are very troublesome and dangerous, for I have known those who have kept their Bed for them, some 6, some 10 Months, and some there are, who have lost sometimes their Legs, sometimes their Lives by them; they come out sometimes to the length of 6 or 7 Yards; when they first come out, they are small like a Thread, and afterwards grow bigger and stronger by Degrees; they wrap them up upon a little bit of Stick or Cotton, and put upon them Onions and Flower of Rice boiled in Milk. The chief care is to be taken not to break them, for then it is that they do Mischief. When mine first came out, for about 40 or 50 Days it came out every day by little and little, without putting me to much Pain, but that I could go up and down till it was come out a Yard and a Quarter; but afterwards, one Day stirring too much, I hurt the Worm and inrag'd him, so that he broke off of himself, and going in, caus'd my Foot and Leg (up to the Calf) to Swell till the Skin was ready to burst, which kept me Sleepless, and cast me into a Fever. I had a Chirurgeon and kept my Bed for about 20 Days, in which time I had several Fits of the said Fever; the Worm was broke to pieces, and came out in several parts of my Foot; but the Chirurgeon apply'd such things as kill'd the Worm, and turn'd it to Matter; he then Lanc'd my Leg a little above the Ankle, and another place of my Foot, and so with Drawing Plaisters drew it all out.

XLVIII.

XLVIII. A certain *Serving-Man*, about 27 Years of Age, dy'd *Hydropical*; which Disease he was molested with 4 Years before his Death. He was ever a *Lifless*, dull, and melancholy Fellow, never chearful nor smiling, especially for 10 Years before he dy'd. His Words came from him as if forc'd, and speaking but a little he would end with a Sigh. When open'd, he was found to have the Left *Lobe* of the *Lungs* almost quite Wasted; but no Ulcer or ought preternatural appearing in the remaining Part, except its Wasting. The Heads of the Vessels and Branches of the *Wind-pipe* as big as in the other *Lobe*. That *Lobe* of the *Liver*, which Buts on the *Midriff*, was Black outwardly for about a Hand's Breadth, and about a Thumb's Breadth with the *Parenchyma*.

Observations on a Man who dy'd of a Dropsy; by Dr. Nath. Fairfax. n. 29. p. 548.

XLIX. Some Years since, there came to a Physician in *Holland* a young Woman of about 17 Years of Age, unmarried and reputed a Maid, of a Florid Countenance and strong Body, having a good Stomach, *periodic Menstruata*, and wanting none of her due Evacuations; nor troubled with Head-ach nor Sleepiness, nor Difficulty of Breathing, nor Drought, nor any of the Symptoms incident to *Hydropical* Persons. This Young Woman having her Belly swollen to Excess in 3 Months Time, was much suspected by the Physicians as if she had been deflower'd, which yet with many Imprecations she deny'd. And indeed the *Tumor* of her *Belly* being felt afforded some considerable Signs to dispossess him of the Opinion he had of her; seeing it was not a Prominent nor Roundish *Tumour*, nor any such as is usual in *Women with Child*; besides that, she made not such a colour'd and Crass Urine as *Child-bearing* Women are wont to do; yet there appearing no Symptoms of a *Dropsy*, no Complaints of the *Stomach*, *Liver*, *Spleen*, *Kidneys*, no Swelling of the Loins or Inferior Limbs, no Leanness in the Body or Superior Parts, no Flaccid or Discolour'd Breasts, but all being thus far in a good Constitution, he sent her away without prescribing her any Physick. After more than 6 Months, having consulted with other Physicians and some Mountebanks in vain, she return'd to him. He now found her Body dry'd and bloodless, her Breath short, her Temples fallen in, her Nose sharp, her Eyes hollow, her Skin wan and ill-favour'd, her Pulse creeping, her Appetite prostrate, her Tongue dry, her Voice weak, her Evacuations sparing, and all her Strength dejected; in a Word, liker a *Skeleton* than a living Body. He being now sufficiently convinc'd of the Nature of her Distemper, tho' the Case was desperate, resolv'd upon the Use of a *Paracentesis* or Incision. But the Patient abhorring this Operation, she was left to herself, and dy'd 3 Months after. Her Body being open'd, there soon appear'd a great Lake of Water; whence at first it seem'd to be common *Ascites*, a *Tumour* of Waters stagnating in the *Abdomen*. Then the *Liver* being look'd after, it was no where seen; the *Mesentery*, *Pancreas*, *Spleen*, and *Kidneys* did not appear: The *Peritoneum* was turn'd into a Bag, by a Separation made of its Interior Membrane from its Exterior, and so enclosing within it the whole Bulk of that Restagnant Water, that not a Drop

A Dropsy mis-taken for Gravitation; by Dr. n. 106. p. 131.

of it had been able to get out into the *Abdomen*. This cost no small Trouble to render it conspicuous, by emptying this Sack of all the *Serum*, and so discovering both Sides of the Bag, made up of the double *Peritonæum*, whose Inner Skin had been sever'd from the Outer, sticking to the transverse Muscles of the *Epigastrium*, the *Hydropical* Waters having forced the Inner Membrane inwards into the hollow of the *Abdomen*, and so forming it into the Shape of a Bag, whose Compass reach'd from the *Pubes* unto the *Diaphragme*, and from the Left Region of the Loins to the Right; so that the Nervous Body of the *Peritonæum* which is naturally as thin as a silken Web, being here thicker and closer than any Ox-Hide was by little and little expanded, as the Capacity of the Womb in *Gravidation* is still more and more enlarg'd. This Bag of the *Peritonæum* being remov'd, the *Viscera* came to view, which were not gravelly, nor tartareous, nor chalky, (as they often are in *Hydropical* Bodies) but only decay'd and colourless: Which Decay by the timely Use of an *Incision* might have been prevented.

Observations on
a Maid who dy'd
of an *Ascites*; by
Mr. J. Turner.
n. 207. p. 15.

L. As the Body lay along, we perforated the *Abdomen*, in the most Prominent Part, by a *Paracentesis*, and extracted the contain'd Liquor thro' a small *Cannula*, to the Quantity of 3 Gallons: Afterwards we laid the Corps upon a Table, in the same Posture, where we made Incision, beginning between the *Umbilicus* and the *Cartilago Ensiformis*, dilating still as we empty'd, till we had made room for a Quart-pot, with which we drew out, to the Number of 76 good measur'd Quarts (including the 3 Gallons extracted before) of a Subsaline, and somewhat Austere *Serum*; besides what was imbib'd with our Spungs, not improbably 2 Quarts more. After the drying up the Residue of this Humour (which in Colour and Consistence did somewhat resemble Water, wherein Flesh newly kill'd had been washed, saving that it was of a somewhat deeper Red, and had a more Crass *Hypostasis*) we plainly perceiv'd that the whole Bulk of this so ponderous a Deluge, was bore up and sustain'd between the *Cutis* and *Peritonæum*; whereby there was made a very great Compression of the *Intestines*, and other *Viscera* to the *Vertebra Lumborum* and *Os Sacrum*. The *Musculi Recti* of the *Abdomen* were to my Apprehension quite Obliterated, or at best, not to be distinguish'd from the *Carnous Pannicle*, or common Tegument of the Body; when at the same Time the outward Covering or *Cutis* itself (notwithstanding so vast and powerful a Dilatation) was full as Thick as in a Sound Body, in some Places much Thicker. In the *Hypogastrick* Region, the *Membrana Adiposa* was observ'd to be above 2 Inches Thick, and seem'd to be no other than a Congeries of little *Bladders*, each of them contain'd in its proper *Capsula*, and implete with a Coagulated *Lymphatick* Juice. The Grumous Part of the Blood in the *Abdominal Vessels* had been thrown forth in many places, and adhered in great Clots to the Membranes. The Thighs, Legs, and Feet, were *Anasacrous*, and so extremely elevated with a Watry Humour, that upon a strict Impress I could have bury'd 3 or 4 Fingers: And yet her Upper Parts, as the Neck, Face, Arms, and Hands, were wonderfully Emaciated.

The

The *Omentum*, or *Kell*, was wholly and absolutely wasted away; The *Intestines* were only viciated in their Colour, which was somewhat Pallid, as if they had been Seeth'd; also the *Ventricle*, *Pancreas*, *Liver*, *Spleen*, *Kidneys*, &c. look'd all of them like Flesh half Boil'd, and the Blood Absorb'd: For altho' none of these *Bowels* did Swim in, or Communicate with the *Serum*, being separated by the aforesaid Membrane, yet the great nearness of the superincumbent Liquids had polluted and ting'd the external Coats of the *Viscera*, with their Preternatural as well as Putrefactive Heat.

The *Intestines* were all of them Distended with *Flatus's*; particularly the *Cæcum* was blown up to a very considerable Bigness. In the *Colon* and *Rectum* some of the Excrements were Contracted like little Balls, and as hard to bear any Impression, thro' the Coats of the Gut, as a Stone, the *Liver* was no more Faulty than the rest of the *Bowels*. The whole Body of the *Spleen* adher'd to the *Peritonæum*, but easily to be separated from it. We could not discover in the *Kidneys* any Impediment, or Lett to the Secretion of the *Serum Sanguinis*, in Case any Attempt had been made upon those Parts by a *Crisis*. The *Vesica Urinaria* was empty, and of a more than ordinary Smallness. The *Ventricle* was fill'd only with Wind, like to a blown Bladder.

The *Diaphragm* was so forcibly impell'd upwards into the Chest, that its *Diastole* must needs be very obscurely assistant to *Respiration*: It was indeed so far Contracted, that its Convex Part bore hard against the *Lobes* of the *Lungs*, whose Substance, as I have seen in some that have dy'd *Tabid*, was very much decay'd and perish'd, and look'd just like Parboil'd Flesh. In cutting open the *Heart*, I did not perceive the least Drop of Water to fall from it: By which it may be justly thought that the *Pericardium*, or *Capsule* of the *Heart*, being altogether destitute of its Refrigerating Liquor, clung immediately to the proper Tunick of the *Heart* itself; upon cutting through whose *Ventricles*, we could not perceive one Drop of Blood, no more than in the rest of the *Bowels*; and the *Liver* itself was destitute of so much Blood as might be thought necessary for its own proper Nourishment, and yet its Salino-Sulphureous Particles which constitute the *Gall*, were deposited into the *Vesica Biliaria*, to the Quantity of about a Spoonfull. I observ'd a very large Protuberance of the *Costæ* and *Sternum*; which perhaps might be occasion'd from the Rarified Effluvia of the Waters, pent up within the Breast, or rather a necessary Consequence of the *Diaphragm's* being so excessively press'd upwards,

I shall not take upon me to determine, Whether the contain'd Liquor happen'd from any Rupture in the *Lactæal* or *Lymphatick Vessels*, according to Dr. *Willis*, or (as more probable to me) if it were not pure *Serum* (the Blood being dissolv'd into its Constituent Parts) breaking forth of the little Mouths of the *Cæliac* and other *Arteries*.

LI. In the Dissection of Madam *Vaillant* by M. *Du Linier*, the *Liver* was found very White without, but Red enough within; the *Epiploon* extremely dry'd; the *Stomach* much bigger than ordinary; the Winding of the

Observations on
a Woman who
dy'd of a Dropsy,
after the Para-
centesis; by Dr.
Ch. Preston. n.
Colon, 223. p. 330.

Colon, which passes under the *Stomach*, extreamly drawn together by 3 Threads. In the *Umbilical Region*, the Intestines *Jejunum* and *Ileon*, much inflam'd, and their Tunicks much more thick than ordinary; In the *Hypogastrick Region*, all the inferior Part of the Intestine *Ileon*, on that Side near the *Bladder*, and all the Bottom of the *Matrix*, as also the inferior Part of the *Rectum*, much inflam'd and Ulcerated; in the Bottom of the *Matrix* there was an Abscess, and the internal Orifice extreamly dilated, about the largeness of a Crown; the Extremity of the inferior Part of the *Ureter* Cartilaginous; the Extremity of the *Tubæ Fallopianæ* went so high as the 2 *Vertebre* of the *Lumbar Region*; in the interior Part it was dilated 6 Lines, and near the Bottom of the *Matrix*, about 2 Inches, and was ty'd to all the inferior Part of the *Kidney*; that of the Left-side was dilated about 4 Lines in the upper Part, and 6 in the inferior. The Right *Testicle* or *Ovarium*, which ordinarily does not exceed the bigness of a Pidgeon's Egg, was here 3 Inches long and 2 of breadth; and in the inferior Part there was found an Egg, hanging by its Ligament, out of the *Tubæ Fallopianæ*, about the bigness of the Yolk of a common Hen's Egg; which, for Experiment, I caus'd to be boil'd, and it harden'd as an ordinary Egg. The Right *Kidney* went up as far as the last of the true Ribs, and descended below the *Umbilical Region*; the *Pelvis* was dilated about 3 Inches in Breadth. and 7 in Length. The greatest Part of the Water had run out in the Operation.

The *Lungs* were of a Livid Colour, as in all *Chronical Diseases*; and on the Right-side were adhering to the Membrane *Plura*; and on the Left-side was an Adherence of the inferior *Lobe* to the *Diaphragme*. In the *Pericard* was little or no *Serum*, and what we found, of a Bloody Colour: In Dissecting the *Heart*, we found a great *Polypus* in the Right *Ventricle*, taking up almost all the Cavity, about 5 or 6 Lines in Thickness, and half a Foot in Length.

From what has been said, it appears impossible that this Patient could have recover'd though the Operation had been perform'd; only this is to be remark'd, That where the *Dropsy* is of a long Continuance, and the Persons much Debilitated, and of Age, in that Case the Operation ought not to be perform'd, for generally the *Viscera* are corrupted. But when you find it convenient to perform this Operation, extract the Water by Degrees, and not all at once, else you endanger the Person; for scarce One escapes of a Hundred that is done otherwise.

The Cause of the Dropsy.

The true Cause of the *Dropsy* I take to be from the Mechanick Structure of the Parts, and the Disposition of the Blood; which are first the Relaxation of the Fibres, and Pores of the *Vessels*, or the *Vesiculæ*, which are between the Arteries and the Veins; or secondly a Compression of the *Vessels*; for the *Lymphaticks* take their origine from the Membranes, which cover the *Muscles*, *Viscera* and *Glands*; therefore, when the *Vesiculæ* are too much straitn'd with *Serosity*, their Fibres lose their natural Force, and become incapable to expel the too great Quantity of Water; but the *Vesiculæ* are enlarg'd from Day to Day, until their Fibres suffer so great an Extension even as to break, from hence is the Source of those Waters; it happens also sometimes, that the Pores

Pores of the said *Vesiculæ* are so widen'd, that the *Lympha* runs into the *Cavity* of the *Belly*, or the Interstices of the *Muscles*. The Cause from the Disposition of the Blood, is either when it is too Thin, or too Viscid; too Thin, that it passes easily through the Pores of the *Vesicles*; too Viscid, that it cannot pass through the *Capillary Vessels*, and by Consequence compresses the adjacent Parts, so causes *Obstructions*.

LII. *Pontæus* (the Famous *Mountebank*) says that for the *Dropſy*, after all other Things, one of the best Remedies in the World is to take *Morsus Diaboli* and put it over the Fire in a dry Kettle, that it may wet it only with its own Juice, and of this to apply a Quantity to the Belly and Reins of the Patient, covering him up warm, and so provoke Sweat; which will come away in great Quantity, and may be maintain'd according to the Strength of the Patient, and Exigency of the Case.

A Cure for the Dropſy; by Sir Theodore Mayerne. n. 211. p. 166.

LIII. A Young Gentlewoman, not marry'd, about 8 Years before her Death found some small Pains in the *Lumbal* Regions, and sometimes made Blackish Urine. If she at any time used any Motion, the Pain would increase; commonly finding most Ease when her Body was sedate. In this Indisposition her Physicians in the Country prescribed Astringent Medicines. About 2 Years after, the *Lumbal* Pain increas'd on the Left-side; and a great Weakness, Loss of Appetite, Ill-Digestion, followed. Of these Indispositions she recover'd again, and was, in all Appearance, Healthful, and so continu'd near two Years and a half: About which Time they return'd again, together with Black Urine, and frequent Incitations to vomit; but of these Disorders she had some Intermiſſions, and so she continu'd about 2 Years. About *Christmas* 1695, she began to be afflicted with Violent Pains, and her Urine appear'd very Black: Of these Extravagant Pains she was much eas'd with the Use of common Clysters, but nevertheless continu'd much debilitated. The Beginning of *May* the Pains increas'd about the Regions of the *Loins* and *Pubes*, and she was once or twice surpriz'd with the falling down of a Weight within her (as she express'd it). When thus tormented she took large Doses of *Opium*, which did somewhat alleviate the Extravagancy of Pain. The Ordinary Position of the Trunk of her Body was more inclining to be Erect than bending forwards, contrary to what we find in those troubled with the *Stone* in their *Kidneys* or *Ureters*, except those in whom the *Kidneys* is intumesc'd. She complain'd of a *Stupor* or Numbness in the Left Region of the *Loins*, whilst very acute Pains affected the *Viscera* of the Lower Belly, especially those placed in the *Hypochondria*. The Pains on her *Pubes* increas'd near the Time of her Death, and a great *Stupor* affected the Left Thigh, which she was scarce able to draw after her, much less to put forwards, in Walking.

A large diseas'd Kidney; by Mr. Will. Cowper. n. 122. p. 301.

The Day after her Death, I was call'd to dissect her Body, which was very much Emaciated. A large *Tumor* appear'd in the Left *Iliac*, extending itself to the Left Part of the *Epigastrium*, even to the *Hypochondrium* of that Side. The *Omentum* appear'd very thin and membranous, cleaving to the Left

Left Kidney; which was very much Intumesc'd, and caus'd that appearance of a large *Tumor* before Dissection. This *Kidney* had taken place of the *Spleen*, and touched the Bottom of the *Stomach*, and in such manner press'd one part of the *Colon* as very much lessened the Diameter of that Gut. The *Stomach* and *Small Guts* were somewhat distended with Wind; the former appeared very loose, as if its proper Tone was much Relaxt. The *Pancreas* appeared a little Indurated. The Left *Spermatick Vein* was very much extended between the *Kidney* and the *Ovarium*; the upper part of that *Vein* being compress'd by the Superincumbency of the lower part of that *Kidney*; insomuch that the Trunk of this *Spermatick Vein* was very much Lessened, immediately before it enters into the Left *Emulgent Vein*. In freeing this Diseased *Kidney* from its many Adhesions to the Neighbouring Parts, its outward Membrane happened to burst in two or three Places, whence issued a large Quantity of Grumous Blood. This *Kidney* weigh'd 5 Pounds, and the other but 5 Ounces, which was of a common Size, and no ways disordered. By the Distension of the Membranous parts of the *Kidney* itself, its Veins were, in a great measure, Compress'd. Its *Ureter F F*, was large through the Intumescence, or thickning of its sides, whereby its Cavity was streightned. In a Division made by cutting into the Body of this sewelled *Kidney*, its inside appear'd like that of a *Schirrus* or Boil'd *Liver*. I found 2 or 3 large Cells *B*, fill'd with Grumous Blood, which proceeded from an Eruption of some Blood-Vessels before Death, which I am apt to think might Alarum the Patient with the Apprehensions of some Weight falling down (as she express'd it.) In the *Vagina Uteri*, near the *Meatus Urinarius* was an Ulcerous Appearance, attended with a Mortification. The Left *Psoas* Muscle was very much Lessen'd by the Compression of the lower part of that *Kidney*; and the Nerves, distributed to some parts of the Thigh, which pass through that Muscle, were expos'd to view.

Fig. 31.

54 Polypus in
the Heart.

Nothing disorder'd appear'd in the *Thorax*, but what is commonly observ'd after Death in all *Chronical* Diseases, viz. a *Polypus* in each *Ventricle* of the *Heart*, and great Blood-Vessels; of which I have commonly observ'd the Right *Ventricle*, and the Veins, to be furnished with the largest *Polypus's*, especially the *Vena Cava* and Right *Auricle*; the latter of which I very lately found compleatly Distended with a *Polypus*, or Coagulation of *Serum* in the Body of a Boy who dy'd with a *Hydrops Thoracis*; in which Case, the Symptoms of Sighing and Difficulty of Inspiration I have always found remarkable. I can't but think the slow return of the Blood by the Veins, is the immediate Cause of the Coagulation of the Serous Part of the Blood, which frames these Bodies, which from the Figure (which they acquire from the Parts they are lodg'd in) are call'd *Polypi*. Hence it is the *Systole* of the *Heart* prevents their being fram'd so large in the Left *Ventricle* and Arteries, as in the Right and the Veins; the Blood being carry'd thro' the Former with much greater Force than the Latter.

Blackish Urine, I believe, is commonly observ'd in many *Feverish* Indispositions; where the Blood is either partially obstructed in its return by the Veins of the *Kidney*, or through its great Velocity in passing the *Kidneys*; when

when some Part of the Globules of the Blood also pass out at the *Urinary Pores* in the Sides of the Blood Vessels; and those Globules being broken, exhibit those blackish Bodies, which appear in the Sediment of the Urine. In these Cases the *Serum* of the Blood passes off with the Urine; for by Evaporating such Urine by Heat, as in a Spoon over a Candle, it will lactesce and become thick like the true *Serum* of the Blood.

Obstructions commonly begin in the most *Capillary Vessels* first; as I have frequently observed in viewing the Transparent Fins of divers living Fishes with my *Microscope*: And though it has been hitherto commonly supposed, that Veins and Arteries are all equally lessened at their Extremities, yet I am of Opinion, (and I believe can give Ocular Demonstration of it too) that the Extremities of divers Blood Vessels are much larger than their Companions. Hence an Account may be given of the partial Circulation of the Blood, and yet Mortifications not necessarily succeed, as in the present Case: For the *Kidney* here being vastly extended, which proceeded from a Retardation of the reflux Blood and *Lympha*, it is conceivable that the Obstructions began in the Membranes, which compose the Parities of the Trunks of the Veins and *Lympha-Ducts*, whence an Intumescence necessarily follows; and the Cavities of those Vessels are lessened: Consequently the reflux Blood or *Lympha* not being duly discharged, those larger Vessels are necessarily distended between their intumesced Sides with compressed Cavities, and their Extremities at the Arteries. Thus we may apprehend how a Part remains intumesced under a partial Circulation, and may (when no ill Juices are joined with the Blood and *Lympha*) continue so for some Months, nay Years, as in the present Case, without any Disorder to the Patient; but on such Motions of the Body, as accelerate the Motions of the Blood, at the Extremities of the Vessels, when there is a greater Quantity of Blood imported than can be discharged by the Veins; whence a sudden Intumescence arises, and Pains necessarily follow. What Astringent Medicines avail, in such like Cases, is difficult to conceive; but Aperitives might be serviceable. Loss of Appetite, Ill Digestion, &c. attend *Nephritical* Cases, by the nervous Communications of those of the *Kidney* with the *Stomach*, &c. whence the *Tone* of that Part, as well as the *Intestines*, especially the *Colon*, becomes vitiated, and subject to frequent Disorders, especially Vomiting and *Cholick* Pains. By *Tone* of that Part, I mean, that proper Distribution of the *Nervous* Ramifications within the Part when extended, as in this Case, and *Intestinal* Ruptures, (as they are call'd) and the like; or when the *Nervous* Ramifications are relaxed, as in *Paralytical* Cases, &c. the *Tone* of the Part necessarily becomes vitiated, inasmuch as its *Nervous* Distributions are disordered. The Contents of the *Stomach* and *Guts* not being duly carried on, are apt to ferment; the contain'd Air being rarified by the natural Heat, the *Intestines* or *Stomach* (not being able to resist the Enlargement of that rarified Air) gives way, and becomes very much distended; whence *Cholick* Pains, and Disturbances in those Parts sometimes arise, as I am apt to think in these Cases. Hence by procuring the Evacuation of this contained Wind, the Afflicted are eased, as by giving of *Clysters*,

sters, &c. To discover the Operation of *Opium*, and how it procures Ease in this and such like Cases, I examined a Solution of *Opium* with my *Microscope*; the Particles of the dissolved *Opium* appeared like fringed Globules. These Particles we were inclined to think (if so convey'd to the Mass of Blood) might so entangle in its *Serum*, and thicken it, as to occasion a Retardation of the Globules of the Blood, and hinder their progressive Motion at the Extremities of the Blood-Vessels. Hence the Blood not passing with its wonted Velocity, does not so suddenly extend those enlarged Vessels, which have a considerable Share in the Intumescence of the Part; but by making the Globules of the Blood pass more calmly, might prevent their sudden Efforts, or Intrusions into those distended Vessels.

The intumefied *Kidney* not only compress the Left *Spermatick* Vein, whereby the reflux Blood of the *Uterus*, *Vagina*, and Parts adjacent, was in some measure retarded, but some of the Nerves of the *Vagina*, and those of the *Pudendum*, were also compress thereby: Hence Pain arising from Inflammation, thro' a Retardation of the Blood at the Extremities of the vast Number of Blood Vessels, about the *Meatus Urinarius*, at its Egress in the *Vagina*; whence Exulceration and Mortification followed. The Magnitude of this *Kidney* prevented the Bending forwards of the Trunk of the Body; whence it was she was oblig'd to keep it erect. The lower Part of the Left *Kidney* had so prest on the Left *Musculus Psoas*, as scarce a 3d Part of its proper Bulk remain'd: Whence necessarily follow'd a great Indebilitation in the drawing the Thigh forwards. She had a great *Stupor* in that Thigh, through a Compression of the *Lumbal* Nerves, which lay expos'd immediately under the intumefied *Kidney*.

I am apt to think, that Cases like this are often taken to proceed from Stones in the *Kidneys*, or *Ureters*: But I conceive, that unusual Posture of keeping the Body erect, may distinguish it; together with an Indebilitation of drawing the Thigh and Leg forwards. If these Symptoms do not conjunctly occur, yet by this we may be admonish'd, that *Nephritical* Disorders are not, as is commonly thought, owing to *Stones*, whether in the *Kidneys* or *Ureters*.

Explanation of the Figure. *A*, The upper Part of the *Kidney*, which touched the Bottom of the *Stomach* and *Spleen*. *B*, the lower Part, consisting of divers Protuberances; the Insides of which were distended with extravasated Blood. *CC*, The *Blood Vessels* of the proper Membrane of the *Kidney* distended. *D*, The *Fat* placed at the Entrance of the *Vessels* into the *Kidney*. *EE*, The *Emulgent* Arteries and Veins cut off. *FF*, The *Ureter* very much thickned in its Sides, and cleaving to the lower Part of the *Kidney*.

Four Ureters
in an Infant; by
Dr. Edw. Tyson.
p. 142. p. 109.
Fig. 32, 33.

LIV. May 23. 1697. Upon the opening an Infant, I found the *Ureters* double to both *Kidneys*; their Origination from the *Kidneys* being at some Distance from each other, but afterwards both of the same Side were inclos'd in a *Capsula*, or Membrane, even to the *Bladder*, where those of the Right Side were inserted severally, yet near each other; but on the Left they seem'd to enter at the same Orifice.

I have given a Cut of the Right *Kidney* and of both the *Glandula Renales*, as well to shew their just Magnitude and Figure, (as they appeared in this Body) as also their Proportion to each other. As far as I have hitherto observed, the *Glandula Renale* in *Embryo's* and *Infants* are greater, at least proportionably, than in *Adults*. They have a large Cavity, which by blowing into them I found emptied themselves into two Veins; whereof the Right immediately passed into the *Vena Cava*, the Left into the *Emulgent*. Besides these, they had other lesser ones from the neighbouring Vessels.

The Glandulae Renales.

Fig. 34.

Fig. 32. A, The Right *Kidney*, whose Superfice seem'd to be variously divided. B, The *Emulgent Vein*. C, The *Emulgent Artery*. d, d, Two *Ureters* belonging to this *Kidney*. Explication of Figures.

Fig. 33. Represents the two *Ureters* of the Left *Kidney*, which a little below the *Kidney* are both inclos'd in a common *Capsula*, or Case, and so continu'd to the *Bladder*.

Fig. 34. The *Glandula Renalis* of the Right Side. B, That of the Left. C, The *Vena Cava*. d, A Vein, or *Ductus*, opening from the Cavity of this Gland, and entering the *Vena Cava*. e, A Vein from the Left *Glandula Renalis*, and is inserted into a Branch of the Left *Emulgent*.

LV. I made a Dog drink a good Quantity of Water, and thereupon caus'd his *Ureters* to be well tied about, and emptied his *Bladder*. After two Hours, I found the *Bladder* empty, and the *Ureters* were not tumid above the Ligature. Being surpriz'd thereat, I believ'd that the Cause might be the too much cooling of the inward Parts, that had all this while been expos'd to the open Air. To avoid this Inconvenience, I caus'd a small Opening to be made on each side another Dog, sufficient to find and to tie the *Ureters*, and to squeeze the *Urine* out of the *Bladder*, by pressing it with one's Hand. This done, I made these Openings to be sowed up again; and then having made the Dog drink good store of Water, I left him for near 3 Hours in the least violent Posture that his Ligatures would permit. Afterwards, having opened both the Holes, and the *Bladder* being pressed with the Hand, there issued out of it a pretty Quantity of *Urine*, and the *Ureters* seem'd to be a little swell'd above the Ligature.

A Passage of Urine to the Bladder, distinct from the Ureters; by M... n. 67. p. 2084. n. 67. p. 2049.

LVI. On the Dissection of Mr. Smith of Highgate, July 8. 1687, we discover'd the *Bladder* very Schirrous, and $\frac{1}{2}$ of an Inch thick, of a preternatural Figure, and distended to the Bigness of a Child's Head; and at the Entrance of the *Ureters* on each side were two Protuberances, of the Bigness of a Hen's Egg each. The *Ureters* were of the Largeness of the small Guts in Children, so that they could easily admit two Fingers into their Cavity. They were both replete with *Urine*, or a Serous Matter; which upon pressure did easily regurgitate into the *Kidneys*, but would not pass at all into the *Bladder*. The *Kidneys* were of their natural Bigness and Figure, but so emaciated, that they were rather large Bags, than of a fleshy Substance; the

A Schirrous Bladder, containing in its Bags a Serous Matter; by Dr. Edward Tyson. n. 188. p. 332.

Cavity of the *Pelvis* being so large as to contain above 3 Ounces of Water. In the *Bladder*, we found a very strange Sort of *Cystes* or Bags, of the exact Figure of Eggs, of several Dimensions, some larger than Goose Eggs, others as big as Hen Eggs, to the number of 12 in all; and about 8 of them whole, and replete with a *Limpid Serum*. The Coats of these *Bladders* were some of them considerably thick, others very thin and tender; all of them loose and free, without the least Adhesion, either to one another, or to the Coat of the *Bladder*. There was little or no *Urine* in the *Bladder*, but what was contain'd in these *Bags*. Nor could we imagine that this miserable Patient could possibly make any Water, but what happened upon the Breach of some of these watry Tumours, when the *Bladder* was crowded beyond its Dimensions; for that the Passage by the *Ureters* into the *Bladder* was impervious.

The Liquor contain'd in these *Bags*, we did conjecture to be of the Nutritious Juice of the Body; and upon tryal of boiling a small Quantity of it, we found it to thicken, and come to the Consistence of a stiff and glutinous Gelly. These *Vesiculae* were undoubtedly form'd from the Tenacity of the Matter between the Membranes of the *Bladder*, in its oblique Passage through them; for that being so glutinous, it was here detain'd till its Superficies was condens'd into a firm Coat, and so by the coming of more Matter was forc'd into the Cavity of the *Bladder*. This, I suppose, from our finding two of these *Ova* in a distinct *Sinus* from the rest, between the Coats of the *Bladder*, at the Entrance of each *Ureter*.

The *Liver* we found very large and hard, of the Colour and Substance of a boil'd one. It adher'd to the *Peritonaeum* on the external Part, and by its vast Bigness had so straitned the *Thorax*, that there was very little room for the *Lungs*. The *Lungs* we found of a livid Colour, adhering close to the *Pleura* on the Right Side: Upon Incision, we found them wholly replete with a purulent Matter, and a *Stone* of the Bigness of a Cherry-stone in one *Lobe*. Dividing the *Pericardium*, we found a fungous Substance covering the *Heart* all over, and Fibres from it, that ran to the *Pericardium* in a great Number, so that they were by these Fibres every where united. The *Heart* was very large, the Right *Auricle* and *Ventricle* were one large undivided Cavity, and therein a large *Polypus*; which ran up the descending Branch of the *Vena Cava* to the very *Jugular*; another Part being distributed to the *Pulmonary Artery*. In the Left *Ventricle* was another *Polypus*, not so large as the former; it had two Branches, one in the *Pulmonary Vein*, another in the *Arteria Magna*, or *Aorta*. One of the *Vesiculae* being opened, had a large Cluster of small *Ova* as big as Grapes, all replete with Liquor; all the rest contain'd nothing but *Serum*.

Suppression of
Urine (not caus'd
by a Stone) cur'd
with Acids; by
Dr. Edw. Bay-
nard. m. 215. p.
30.

LVII. A Servant of Mr. *Banister's* had labour'd for 7 or 8 Days under a total Suppression of *Urine*. Mr. *Ch. Bernard* try'd his *Catheter*, but found not the least Appearance of any *Stone* there, nor a Drop of Water in his *Bladder*. Whereupon Dr. *Baynard*, supposing that it might be the same Case of which that most learned Prelate Dr. *Wilkins*, late Bishop of *Chester*, died, caus'd

caus'd the Patient to take a Quantity of *Acids* in a convenient Vehicle; upon which, Secretion being presently made, he immediately *urined* in great Quantity, and was thereby restor'd to his Health.

A Member of Parliament, being found in the like Condition, was by the Use of *Acids* restor'd to his Health. And in several Cases since, he has found it to answer with great Success.

In another like Suppression of Urine, and after many Medicines given in vain, Mr. Banister propos'd Dr. Baynard's Method, which caus'd the Patient to *urine* presently.

LVIII. A Stone was taken out of the Womb of a Woman, near *Trent* in *Somersetshire*, by Incision, in *Easter* 1666. I have seen the Stone, and weigh'd it in Gold Scales, where it wanted somewhat of 4 Ounces; but it had lost of the Weight it formerly had, being now very light for a Stone of that Bulk. It is of a whitish Colour, lighter than Ash Colour; it had no deep Asperities; and had somewhat of an Oval Figure, but less at one End than a Hen-Egg, and bigger and blunter at the other End than a Goose-Egg.

A Stone taken from a Woman; by Dr. Beal. m. 18. p. 320.

LIX. 1. Mr. Goodrick (a Chirurgion of *Bury S. Edmunds*) affirmed to me, that himself cutting a Lad of the Stone, tooke out thence, at one time, 96 small Stones, all of them of unlike Shape, Size, Corners, Sides; some of which were so bestowed as to slide upon others, and had thereby worn their Flats to a wonderful Slickness. He assured me also, that in the same Place, another, when dead, had a Stone taken from him almost as big as a new-born Child's Head, and much of that Shape.

Many Stones taken from one Bladder; by Dr. Nath. Fairfax. n. 26. p. 482.

2. M. Jo. Braun of *Dantzick*, a Gentleman of 71 Years of Age, being dead, I opened his Body, to find the Cause of the excessive Pains he had endur'd for two Years and a half in his *Penis*, with a continual Cutting, Burning, and Pressing of his Urine, coming from him Drop-wise; until at last it came to a constant Endeavour of going to Stool and of making Water, which a few Weeks before his Death ended in a continual Running of Urine, with very sharp Pain; after which, about 4 Days before his Death, to my Knowledge, the Water was totally stopped. We found the Bladder quite full of Stones, of which the biggest was of the Bigness of a Pigeon's-Egg, and somewhat larger. Of the bigger Sort there were 16, yet differing in Size. The rest were very small, to the Number of 22. We found not a Drop of Urine in the Bladder; but it had already made, on the Side of the Orifice of the Bladder, an Opening of a considerable Bigness; upon which Death necessarily ensued. In the *Kidneys*, and *Ureters*, there could not be found the least Grain or Mark of Sand.

By M. Casparus Wendland. n. 99. p. 6156.

3. Several of the lesser Sort of these Stones were Triangular and Quadrangular; their Flats worn to a great Smoothness, and their Corners blunted. The greatest Stone weigh'd 206 Gr. the least 3 Gr. all the 38 weigh'd 4 Ounces. The Matter of the Stones is exceeding compact, and like white Clay;

By Mr. Chr. Kirkby. lb. p. 6155.

Clay; and though the several Coats may be discerned in one of them which I broke, yet they are not easily separable.

*Stone in the
Kidneys; by M.
Chr. Kirkby. n.
71. p. 2158.*

LX. A Woman near *Dantzick*, of 56 Years of Age, unmarried, whose whole Course of Life had been extremely sedentary, was troubled, some Years before her Death, with great Pains in her Back, especially towards her Right-Side, and a continual Inclination to, and effective Vomiting; whose *Urine*, for some time before, was turbid, and as it were mingled with Blood, yet totally void of Salfuginous Matter: Her Physicians adjudging that Symptom of bloody Water to have proceeded, *ex prematura Cessatione Menstrum* (which left her in the 40th Year of her Age;) thereby perhaps deceived, because there was never either *Stone* or *Gravel* voided by her. But her last Doctor (from whom I have this Relation) adjudged it to proceed *ab Affectu Nephritico & quidem Gravissimo*. When she was opened, he found the Left *Kidney* filled with large *Stones*, but the Right wholly petrified, covered with the ordinary Skin without any Flesh: It was both Massy and Ponderous, so concreted by the close Coalition of minute *Sand*, which might be rubb'd off by your Finger.

*Large Stones
voided by a Wo-
man; by Dr.
Geo. Garden. n.
234. p. 843.*

LXI. A poor Woman near *Aberdeen*, who hath been of a long time sadly afflicted with the *Gravel*, hath lately passed 4 *Stones* of an unusual Bigness; of which I have one by me, which, though it be not the greatest of the 4, is yet more than 5 Inches about the one way, and 4 the other: They are all Oval; the first, and part of the 2d, were smooth; but the other two very rough; and the last, the biggest, which being come away about *Christmas* 1676, was bloody on one side when I saw it.

*A Stone of 32
Ounces.*

A *Stone* was also found, the same Year, in a Gentleman's *Bladder* in this Country after his Decease, weighing 32 *Ounces*.

*Two large and
oddly shaped
Stones in the
Kidneys; by Dr.
Fred. Slare. n.
157. p. 534.
Fig. 35.*

LXII. 1. I here give you the *Figure* of a *Stone*, somewhat resembling the *Kidney*; for that was quite worne away, and this *Stone* fill'd up the Place, It weighed, when I took it out of the Body, $7\frac{1}{2}$ *Ounces*; but not so much now. I measur'd 7 Inches upon the round. I find it consists of several *Lamina* laid over one another, as that of the *Bladder* does.

Fig. 36.

2. I had Leave of Sir *Theodore de Vaux* to take the *Figure* of that *Stone* which was taken out of the Body of the late Duke of *Norfolk's* Father. It seems to have spread some of its Branches into the great Vessels. It weighs $4\frac{1}{2}$ *Ounces*: And measures long-wise, from one Extreme to the other, 4 Inches complete; and the Extension of the Branches from one to the other, measured cross-wise or transversely, $3\frac{1}{2}$ Inches.

*A very great
Stone of the
Bladder, by
n. 171. p. 1015.*

LXIII. This *Stone* was taken out of the *Bladder* of one *Fr. Dugood* of *Auchenhove* in *Aberdeen*. The Man who bred it, lived till he was 50 Years old. The Length of it is $5\frac{1}{2}$ Inches, the Diameter, $3\frac{1}{2}$; the Weight two Pound, three Ounces, and six Drams.

LXIV. Two *Stones*, of the Shape and Bigness of the *Figures*, were voided by the *Penis*, without any considerable Pain, by a Person about *Worcester*, 1684. Stones voided per Penem; by Dr. Cole. n. 175. p. 116a. Fig. 37. 38.
The Person that voided them told me, he was for many Years subject to great Pain, first in the *Kidneys*, and afterwards in the *Bladder*, when that in the *Kidneys* ceased. But after their Exclusion, he was free from Pain.

LXV. A Stone came from the *Bladder* of a Gentlewoman of *Wallingford*, at the Age of 63 Years. The Compass of it was $5\frac{1}{2}$ Inches, the Length $4\frac{1}{2}$ Inches, the Weight 3 Ounces *Avoird.* This Stone was, at its coming off, taken out by her Husband, without the Help or Instrument of Physician or Chirurgeon, and without Effusion of Blood. Since its coming off, she has been troubled with *Urina Incontinentia*. A large Stone voided by a Woman; by Dr. n. 178. p. 1271.

LXVI. Mrs. *Margaret Plunket* of *Dublin*, May 29, 1691. voided through her *Urinary Passage*, by the help of Nature alone, without the Use of Remedies, or any forcible Means whatever, a Stone somewhat resembling a hard Pear a little prest or flatted. Its Circumference measured, the longest way, $7\frac{1}{2}$ Inches; round about, where it was largest, $5\frac{1}{2}$ Inches; its Weight at present, according to *Troy Pound*, 3ij, 3ij, 3j, gr. 6. It has lost considerably both of its first Bulk and Weight, by many little Fragments breaking off from the smaller End *A*, where 'tis much softer, smoother, whiter, its Parts more porous, and so incoherent, that the least Force severs them: Whereas the bigger End *B*, as far as the Stroak *c c c*, is of very different Texture, much more close and compact, cover'd with a yellowish shining Crust, rough, granulated, and as hard as the best *Portland Stone*. For these three Months past, whilst 'twas sticking in the *Urinary Passage*, and coming away, she has suffer'd great Pains, and a perpetual *Strangury*, or an involuntary dropping of her Water from her; and this Infirmary still continues, by reason the Largeness of the Stone has over-stretched the Fibres that compose the *Sphincter* of the *Bladder* in its Passage through it, whence their Tone is so relaxed, that they have lost all Power of Retention; and for this Reason, I find all Women that void *Stones* this way, of any considerable Bigness, are constantly attended with this Weakness. But since the Stone came away, her Pains are so abated, that she can walk about. A large Stone voided by a Woman; by Dr. Tho. Molineux. n. 202. p. 818.
Fig. 39.

LXVII. Generosa quædam Annorum 31, Anorexiâ ac *Ventriculi Dyscrasiâ* diu laboraverat, ut vel parùm appeteret, & ne quicquam deglutire posset quod non statim evomit, cum copiosa *Æruginosâ Bilis* per *Alvum* dejectione. Ad hanc accitus multa adhibui Remedia *Ventriculi Viscerumque* Tono labefacto appropriatissima, undè aliquandiu melius se habebat, ut per aliquot Menses quotidie in apicum prodiret. Verum in herba latebat Anguis qui ipsam Mordicus tenebat miseram, ut in dicta Symptomata recidivationem pateretur, & Morbus nullis Medicamentis esset emendandus. Observavi enim prædicta Symptomata a *Calculo* in *Rene Sinistro* hospitante processisse. Ipsi tandem Mense *Julii* *Aquas Epsamenses* acidulas vehementer appetenti, & tunc temporis An extraordinary Stone in the Kidney; by Dr. Rob. Witty. n. 207. p. 30.

temporis Tertianâ Nothâ insuper detentâ, suadebam, ut Aërem istum purum aliquandiù inspiraret, ac Septimanas aliquot hilariter transigeret inter Hydropotas; Aquas vero ut parcius biberet, nè indè *Calculosa* Symptomata magis irritarentur. Post duos Menses reversâ omne vergebat in deterius, ut nec quovis *Cardiaco* per vices, nec Cibo reficeretur, nec in utrumvis Latus præ Doloꝛe decumbere posset. Ipsa tandem, inter Mulieres optima, innumeris pressâ Symptomatis, Animam in Salvatoris Sinum placidissimè expiravit, 28. Jan. 16⁷².

Die sequenti, Cadaver aperuimus. *Pulmones* male colorati, ac dextram versus computruisse videbantur, ut *Phthiseos* impendentis (si diutius vixisset) metum incuterent. *Ventriculus* ultra modum distentus, ac adinstar *Vesica* inflatâ tumefactus, proxime emicuit, ut vel indè ob tenuitatem, ac Fibrarum solutionem, Tonus ejus necessariò debilitaretur, & ingesta vel statim Vomitione rejicerentur, vel in Alvum cruda sponte defluerent. *Corculum* admodum exile, ac instar vacuæ Crumenæ molle deindè conspeximus, cujus Parenchyma, diuturniori Febris supra-dictæ atque *Hæctices* inde sequentis Calore, in Liquore proprio eliquatum, mollitiem contraxerat: Et quidem inde factum est, ut Pulsus constanter haberet undulantem, ut versus finem vix sentiri posset, quin *ἀσπυξία* detineretur. *Jecur* quidem sat sanum, at supra modum extitit largum, quod non solum Dextrum pro Naturæ Instituto occupaverat, sed ad Sinistrum Latus mirificè extendebatur, atque illud etiam implebat, ut *Lienem* inde depauperatum censeremus, qui parvus plus justo fuit & exilis. Et quidem *Jecur* utrinque (nempe tam in Sinistro quam Dextro Latere) adeò pertinaciter per totum adhærebat, præcipue in Dextro, ut à Chirurgo non sine vi ac difficultate divelli posset. Et quidem hinc evenerat ut per aliquot Menses in Latera dormire nequiret, nedum sine Doloꝛe in utrumvis inclinare; quin *Hepar* justo gravius *Peritonæum*, Membranam sensus exquisitissimi, dolorosè distenderet, & *Ventriculus* præter modum de bilis ad Vomitionem à Compressione stimularetur. In concava utriusque *Hepatis* parte (si ita mihi loqui liceat, cum reverà unicum tantum esset in utrumque Latus protensum) delituit *Vesicula Fellea*, ita ut plane duæ extiterint, à seinvicem per Longitudinem Manus meæ ad minimum disternatæ, *Bile* turgidulæ; quæ vero ad lævum *Hepar* adnascebatur, alterà minor erat, & quidem nigrior.

Ad *Reνες* tandem devenit, quorum Dexter scopo Naturæ ordinario in unaquaque re conformis erat; neque in ea Regione (quantum novi) de minimo Symptomate quærebatur *Ægra*. In Sinistro autem, ubi Morbi Fomitum, Mortisque Causam inesse semper dixeram, *Calculus* non admodum gravem quidem, aut ponderosum, (cum Semiunciam non excederet) sed miro modo tortuosum evulsiimus, ceu Creta albidum, ac instar Radicis alicujus in tres Surculos medio connexos divaricatum ad Latitudinem trium Digitorum. Eheu! Quantos Dolores isti Mulierum optimæ ipsa *Calculi* Figura peperat, quæ triplici Cuspide *Renem* compresserat, ut in formam sui similem distorqueretur *Parenchyma*.

LXVIII. In Sept. 1695, I was carry'd to one Mr. *Blondel*, who was lately recover'd from a feverish Indisposition. He complain'd of a very hard Swelling a little behind the *Scrotum*, which had remain'd there many Years, and created great Uneasiness to him. Upon examining it with my Fingers, I immediately declar'd it to be a *Stone* of a very odd and irregular Figure. He had about 20 Years before, while a Lad, been cut by Mr. *Hollier* for the *Stone* of the *Bladder*; and he had not long recover'd from under Mr. *Hollier's* Care, before he began to complain of Pain, which resembled his old Pain of the *Stone*; and this continu'd upon him for 4 or 5 Years, before he was sensible of any Fulness or Swelling in *Perinaeo*, which you are to suppose at first but small. I am inclin'd to believe that Mr. *Hollier* left either a couple of little *Stones*, or Pieces of *Stone*, at the time of Extraction, which were by Degrees protruded into the *Urethra*; but being too big to be voided, there lodg'd themselves, and so by perpetual Accretion arriv'd to that Magnitude which you see. He constantly complain'd of Pain in making Water: Which ordinarily flow'd *Guttatim*, and involuntarily, for several Years past. Nor was he longer at Ease, than while his *Bladder* was full and distended with Urine; which Distention was continu'd all along the Neck and the *Urethra*, as far as where the *Stones* were bedded; for his only Way of procuring Ease to himself, was by frequent drinking very large Quantities of small Beer or Water; and as soon as the Separation could be made of the Urine into the *Bladder*, and while that continued full, he was sensible of some Ease. He has been likewise exceeding liable to Vomiting of late, and generally molested with a *Diarrhæa* for some Years past; both which had lately so increas'd upon him, as very much to have impair'd his Health, and weakened his Constitution.

After the Evacuations that are proper to precede such an Operation, I cut upon the most protuberant Part of the *Stone*, (which I then suppos'd to be but one) and making my Incision pretty large, the upper Part, which prov'd a distinct *Stone*, and had form'd itself a Socket in the lowermost, slipped out with little or no Difficulty; the other, which was forked, and was as it were bound in, as if it had adhered to the *Urethra*, was removed with more Trouble, and broke in the taking out, they being neither of them very hard. To facilitate the removal of this *Stone*, I put two of my Fingers up his Fundament, to secure it from retiring towards his *Bladder*, and to my great Surprise I found, that one of the Angles had perforated into the *Anus*. There was not an Ounce of Blood lost in the Operation; the *Stones* having lodg'd long there, you must imagine had made a very great Distention of the *Urethra*, so that it was become so callous, that I seem'd to cut through a Cartilage.

A, The Point which tended towards the *Glans*. B, That Part which lay in the *Acetabulum*. C, The Part upon which I made Incision. D, The *Acetabulum*. E, The Point which lay toward the Neck of the *Bladder*. F, That which had perforated into the *Anus*.

Two Stones
lodg'd 20 Years
in the Meatus
Urinarius, by
Mr. Ch. Ber-
nard. N. 220. p.
250.

Fig. 40.

*A Prodigious
Stone in the
Bladder; by Dr.
Ch. Preston. n.
222. p. 310.*

LXIX. In the Hospital at *Paris* call'd *L'Hospital de la Charité*, there is preserv'd a *Stone* of a prodigious Bigness, weighing about 15 Ounces. It was taken from one of the Religious Brothers in *June* 1690; but he died in the Operation.

*A Stone cut
from the Bladder
which adhered to
it; by Dr. Ch.
Preston. lb.*

LXX. In *June* 1696, while I was at *Ghent*, *M. Parfaima* Lithotomist found a *Stone* adherent to the bottom of the *Bladder*. When he made the Operation, he could not extract the *Stone*, so that he was obliged to leave his Patient in that Case; there follow'd an Imposthume, and 8 Days after he extracted it with great Ease. The next Day he shew'd me the *Stone*, to which the Fibres by which it was tied were yet adherent, and could easily be observed by the naked Eye, without the help of a *Microscope*, so that I could not question any thing as to the Matter of Fact.

*Several Stones
voided by a Boy
in Scotland; by
Sir Rob. Sib-
bald. n. 242. p.
264.*

LXXI. 1. In *May* 1698, a Boy, in the 13th Year of his Age, had the Misfortune to fall backwards with his Head upon a *Stone*, and lay $\frac{1}{2}$ of an Hour without Sense. The next Day he vomited some Blood; felt a Pain and Weight in the hinder Part of his Head and Neck, and lost Appetite. Above a Fortnight after, as he was coming out of the Country, he had a frequent Desire to piss, and lighted from the Horse several times, but could make no *Urine*; he vomited in this time: The Suppression had continu'd more than 24 Hours when I came to visit him. He had a great Pain in his Head, a Pain in his Back and Groins, and in the Region of the *Bladder*, which was swell'd, and he could not suffer it to be touch'd. I caus'd some mild Diureticks to be given to him presently, and anointed his Groins and the *Regio Pubis* with the usual Ointment, and caus'd a Clyster to be injected; upon which, that Night he pass'd first some *Sand*, and then some *Urine* by Spoonfuls. I caus'd him afterwards to be put in an half Bath of appropriate Simples. He was the Days following let Blood and purg'd; and because the Pain and Weight in his Head troubled him much, a large Veficatory was apply'd to the *Nucha*, which discharg'd much Humour from it. While this was a doing, he pass'd very much *Sand* of a greyish and whitish Colour; and after the first Purge, began to pass *Stones* by the Yard of a considerable Bigness, with Pain in the Back some time before they fell down, then in the Groins, or along the *Ureters*, and most in the Right Side, yet sometimes in the Left also. He found the Yard much dilated while they pass'd it, and he had a smarting Pain then and while the *Urine* flow'd; the *Stones* came in with the first of the *Urine*: He got several Emulsions, which had good Effect. Some of the *Stones* were round, some oval, some triangular, some of a pyramidal Form, some cubical. The Colours were different, some whitish, some brown, some bluish, some black, or of a dark Colour; the Consistence of a sandy *Stone*: They are not made up of several Coats upon other, (as many confirmed *Stones* are) but look like Bricks, and may easily be mouldred to Powder; some in Thickness the 12th, some the 10th, some more than the 6th Part of an Inch, and some half an Inch

Inch long; most of them approach'd to a triangular Form. He found a Weight in the *Bladder* when they fell down; and he told me, he was sensible they came down the *Ureter*. He leap'd and ran sometimes to hasten their Descent. In a Fortnight's time, he had pass'd above 60 of them by the Yard. Upon the 20th and 21st of *June*, he pass'd 3 by the *Fundament*, since which he pass'd none by the Yard. Two of them were triangular, pretty big, and one as big as a little Plum, but of the Shape of a Pear; of the same sandy Consistence as the former, and of a Greyish Colour. His Parents told me, that for some Years, that they lived near to the Shoar of the *Firth of Forth*, the Boy ran often after the Women that catch'd the Sand Eels (*Ammodites*) and brought home his Pockets full of them, which oftentimes he boil'd, without taking Pains (as he ought) to free them of the Sand that stuck to them. This, with the glutinous Juice of that Fish, and the Sand mix'd with the Bread, and other Aliments he us'd, hath furnish'd abundant Matter for these *Stones*. It is like (since he never had any Symptom of this before the Fall he got of late) the Hurt in the hinder Part of the Head might have occasioned some *Torpor* in the Nerves, so that the *Fibrilla* in the *Kidneys* could not act so vigorously (as need was) in the Separation and Expulsion of the *Sand*; and thus it came to gather and form into *Stones*.

3. I had the Discovery of the *Cheat* of these *Stones* from Dr. *Pitcairn*, who was at the Pains to find it out. This roguish Boy, to be kept from School, had so much Cunning as to impose upon a fond Mother and other People.

The Cheat detected, by Dr. Jo. Wallis. n. 266. p. 688.

LXXII. A Divine, about 70 Years of Age, after he had these 10 Years suffer'd much from a confirm'd *Stone* he had in his *Bladder*, in 1697 pass'd a vast number of *Slices* of several Figures, many of them cornered and pointed; much of the Thickness of a Shilling *Sterling*; white within and smooth, but without of a dark Colour, with Pain, and sometimes a *Suppression* of *Urine* for several Hours precedeth them; he maketh Use of the usual Remedies: In the Intervals he hath tolerable good Health.

Broken Stones voided, by Sir Rob. Sibbald. n. 242. p. 267.

I am told by an expert Physician of two Patients of his, the one yet alive, who after passing an incredible number of these *Slices*, is now in perfect Health, and free of that Disease. The other, who died long ago, after passing for a long time such *Slices*, became free of the Disease; and when his Body was opened at his Death, no *Stone* nor *Slices* were found in his *Bladder*.

LXXIII. 1. The Patient from whom this *Stone* was cut, told me, that about 8 Years before it was taken from him, he suffer'd an exceeding Cold in a Winter Sea-Voyage, which lasted much longer than he expected; and that, not long after his Landing, he found a certain *Nodus* or hard Lump in the very Place whence this *Stone* was cut. From that time, upon all fresh Cold-taking, he suffer'd much Pain, in that Part especially; and yet, that Cold being once over, that Part was no more painful than the rest of his Mouth.

A Stone cut out from under the Tongue, by Dr. M. Lister. n. 83. p. 4062.

Mouth. In the 7th and 8th Years, it often caus'd sudden Swellings in all the *Glandules* about the Mouth and Throat, upon the first Draught of Beer at Meals, which yet would in a short time fall again. But at last it began its Work with a certain *Vertigo*; which vertiginous Disposition continu'd more or less from Spring till *August*; in which Month, without any previous Cause, save Riding, the Place where it was lodg'd suddenly swell'd, and ran purulent Matter at the Aperture of the *Ductus Whartonianus*. But it suddenly stopt of its running, (which he cannot attribute to any thing but Cold) and swell'd with a great Inflammation, and very great Danger of Choaking, it being scarce credible what Pain he suffer'd in endeavouring to swallow even Beer, or any liquid Thing. This Extremity lasted 5 Days, in all which time the Party had so vast a Flux of Spittle running from him, that it was not possible for him to repose his Head to sleep, without wetting all the Bed about him; insomuch as that it was very much question'd by some friendly Visitants, whether he had not of himself, or by Mistake, made use of some Mercurial Medicine. The first Day the *Saliva* ran thin and transparent, almost like Water, without any Bubbles. The second Day it ran frothy, it tasted salt, (which yet he is apt to think hot rather than really salt, because that Day the Inflammation was at the Height.) The third Day it roap'd exceedingly. On this Day, a small Pin-hole broke directly over the Place of the *Stone*, and ran with purulent Matter as formerly. The fourth Day, the *Saliva* ran insipid, sensibly cold in the Mouth, (which again confirms me in that Opinion, that the former sharp Taste was the Effect of Heat, and not the immediate Quality of salt Humour) very little frothy. The fifth Day, (which was the Day of the Incision) it ran as on the fourth, but left an extreme Clamminess on the Teeth, insomuch that they often clave together as though they had been join'd together with Glue.

Upon the Incision, which prov'd not wide enough, the Membranes or Bags, wherein the *Stone* lay, came away first. The *Stone* itself was so hard as to endure the *Forcipes* in drawing it forth. It was cover'd over with Grass green Matter, which soon dry'd, and left the *Stone* of a whitish Colour. It is but light in Proportion to its Bulk, weighing about 7 Grains; and 'tis much of the Shape of our ordinary Horse-Beans. There are visible Impressions upon it of some capillary and small Vessels it was bred amongst. Lastly, it is scabrous or rough, Sand-like, although the Substance is *sophaeous*.

A Stone bred
at the Root of the
Tongue, by M.
Bonavent. n.
347. p. 449.

2. *Tho. Wood*, of *Wrotham*, was so troubled with a *Quinsy*, that he could hardly swallow any Liquid. I found the *Tumour* tend to Suppuration inwardly, about the Root of his Tongue on the Right Side; but without any Sign of Suppuration outwardly, though it appear'd there almost as big as an Egg. I order'd him maturing Gargles; and the next Day he broke it with his Finger, and brought out of his Mouth near $\frac{1}{4}$ of a Pint of Matter, and with it at last a *Stone*. He had likewise a *Ranula*; and before he had broke the *Tumour*, and spit out the Corruption, he could hardly speak. I believe this *Stone* to be of the same Nature as those generated in the *Kidneys* and *Bladder*.

3. The

3. The Weight of this Stone in Air is 7 Gr. in Water $3\frac{1}{2}$; and therefore By-----*Id.*
its *specifick* Weight compared with Water, is as 1931 to 1000.

LXXIV. Mr. Robert Bacon, of *Windsor*, above 75 Years old, sanguine and chearful in his natural Temper, about 12 Years before his Death was observed by his Friends, at his Return home from Walking, to bend double to his Right Side, insomuch that he would be ready to fall, and has been brought Home in Coaches and Sedans, yet was always temperate, and never observed to be disordered in Drink in his Life. He would often say, that he fear'd Fatuity or Distraction, and would pray that God would keep him in his right Mind. In his latter Years, his Appetite to all Sorts of Food inclin'd to *Canine*, and his Thirst very great. He often complain'd of Pain in his Bowels. He was always desirous to have his Head rubbed many times in the Day. His Urine and Excrement came away always involuntary, at Bed, Board, &c. of which he did not seem at all to be sensible. Of late he would always hang down his Head in a prone sleeping Posture, and his Head was very hot; he did sweat very much every Night, and wet his Linnen extraordinarily. And in the whole, his rational Faculties seem'd to be quite lost for a great while before he died; for he would usually take up Tongs, Fire-Shovel, Brooms, (many times all together) to walk by, though he had a Staff of his own; he would also hale the Chairs about the House and up the Stairs, and grasp at any thing with his Hands; he would often tumble on the Ground, and seldom rise without Help; he did rather creep along by Walls and Chairs, than go, tho' formerly he went very upright. Of late it was 2 or 3 Folks Work to support him to his Bed; he would put 2 or 3 Hats at a time upon his Head, like an Antick; he would many times strike those that attended him. He died of a Fever Nov. 4. 1686.

A Stone in the Glandula Pivialis, by Str Edm. King. m. 169. p. 228.

Upon Dissection, we found the *Liver* indifferently well colour'd and firm; the *Spleen* shrivell'd; the *Omentum* whole, but ill colour'd; the Right *Kidney* sound, with a few small *Stones*; the Left *Kidney* two Parts of three wasted, and some coarse *Gravel*, but both *Kidneys* very fat: The *Bladder* of *Gall* fill'd with one *Stone* only, and that no bigger than a long Nutmeg; some little coarse *Gravel* and small *Stones* in the *Bladder* of *Urine*. The *Lungs* well enough, only by the Stagnation of Blood discolour'd, and fill'd in several Places with *ichorous* spumy Matter. The *Pericardium* very thin and too tender, and too little Water in it. Very little Blood in the *Ventricles* of the *Heart*. The *Auricles* of his *Heart* perfectly sound and strong, as of any sound Man of 20 Years old. Those, and the Strength of the Muscles of the *Heart*, I admir'd.

The *Dura Mater* was extremely hard, thin, and white, a slender Embroidery of Vessels. The *Pia Mater* all full of seeming turgid Glands, and a great Distention of *Lymphaducts*, full of coagulated *Lympha*: The Substance of the *Brain* loose and shrunk, very white; very little of the cineritious Colour to be seen: The *Corpus Callosum* very flaccid. The whole Body of the *Brain* was shrunk about a 3d Part. Between the 2 *Meninges* of the *Brain*, was near a Pint of extravasated *Serum*, that must needs oppress the

the *Brain* very much: The *Ventricles* of the *Brain* full of *Serum*: The *Plexus Choroides* extremely large in Length, as well as Breadth and Thickness: The *Nates* and *Testes* very small and shrunk: The *Thalami Nervorum Opticorum* plump and fair: The *Corpora Striata* large and fair, full of large *Stria* as I have seen.

The *Glandula Pinealis* was firm and fair, well colour'd to look on, of the exact Figure and ordinary Size: Feeling of it, and finding it harder than ordinary, I prest it, and found in it a *Stone* in a Film, or rather a *petrified Gland* in a Film. I do not remember I ever heard of such a thing before; I am sure of all the *Brains* I have dissected, (and I may say I have dissected more than an hundred) I never saw such a one. The *Glandula Pituitaria* was half wasted; that Part that was left was very hard and brittle; had not the Tone of a true *Gland*, nor Substance, according to my Observations; unless of a vitiated *Gland*. The *Cerebellum* seem'd well enough, and all down the *Cauda Medulla Oblongata*.

Before he became so mopish, he would say, he felt a certain kind of Fierceness within him, which (it is probable) made him to utter some kind of Vociferation when he was displeas'd at any thing.

Stones found in
the Heart; by---
n. s. p. 86.

LXXV. The *Belly* of the Earl of *Balcarres* being opened, the *Omentum* was found lean and small; his *Liver* very big. The *Spleen* big also, fill'd with a black and thick Humour. His *Stomach* and Entrails all empty, of a Saffron Colour, distended with Wind only. The *Bladder* of *Gall* swell'd with a black Humour. The *Kidneys* fill'd with a kind of grumous Blood. In the *Thorax*, the *Lobes* of the *Lungs* were all entire, but of a bad Colour; on the Left Side somewhat black and blue, and on the Right whitish; with a yellowish Knob under one of the *Lobes*.

The *Pericardium* being opened, there appeared none of that Water in which the *Heart* uses to swim: And the external Surface of it, from the Base to the Tip, was not smooth, but very rough. It being cut asunder, a Quantity of thick inspissate Liquor ran out; and beneath the Base, between the Left and Right *Ventricle*, two *Stones* were found, whereof the one was as big as an Almond; the other two Inches long, and one broad, having 3 Auricles or crisped Angles: And in the Orifice of the Right *Ventricle*, there was a fleshy fattish Matter.

The whole Body was Bloodless, thin and emaciated, of a black and bluish Colour. The *Skull* being opened, both the *Cerebrum* and *Cerebellum* were big in Proportion to the Body; and out of it ran much more Blood than was seen in both the other Regions together.

Stones found in
the Lungs by Mr.
Ch. Kirkby. n.
71. p. 2159.

LXXVI. A Boy near *Dantzick*, about 19 Years old, who had been from his Cradle disposed to a *Consumption*, accompanied with a continual Coughing, great Emaciation, and continual Heat, and labouring under this Distemper, died. Being opened, a great Quantity of watry Matter ran out of the *Abdomen*, of a chylous Consistence; almost all the *Glandules* of the *Mesentery*, through which pass the *Vena Lactea*, were extraordinary great, and

and hardned beyond the Hardness of a *Schirrhus*. The *Lungs* were grown to the Breast round about, almost inseparable, full of purulent Ulcers, but more especially the Left Side, obstructed and fill'd with much *Gravel* and small *Stones*; yea, whole Pieces of the *Lungs*, especially the Extremities, about the Thickness of a Finger and more, were hardned into a *stony* Matter.

LXXVII. After throwing up the *Sternon* of a Woman, I found the *Lobes* of the *Lungs* extremely turgid, and its *Vesicles* implete with a grumous Blood. Their investing Membrane in the upper Part adhered firmly to the *Pleura*. The Right *Ventricle* of the *Heart* was fill'd with a large Quantity of coagulated Blood, but the Left seem'd exsanguious; and I observed a Stagnation, and great Extravasation of Blood upon the Right Side of the *Pleura*. Beneath the *Diaphragm*, I found the *Ventricle* and *Intestines* much inflam'd; the *Omentum* fair and large. The *Spleen*, to Admiration, so augmented in Bulk, that I suppose it weighed not less than 2 or 3 Physical Pounds. Upon cutting through its Body, there was discharg'd several Ounces of a very fœtid and putrefied Blood. The *Liver* also was much larger than usual, but its *Parenchyma* firm and sound.

The *Vesica Biliaria* seem'd full of *Bile*: But more curiously examining of it, I found a *Stone* very beautifully crufted over with *crystalized Salts* of various Figures, conical, cubical, pyramidal, &c. The one half of it lay immerst in *Bile*, whose Quantity was inconsiderable; for indeed this *lapidious* Concretion took up the whole Cavity of the *Bladder*, and weighed, immediately after it was taken from its Receptacle, 2 Dr. 15. Gr.

We discovered in one of the *Kidneys* a large *Abscess*, and discharged a great Quantity of wheyish Matter.

LXXVIII. An. 1690. A Lady, who had been drinking the Waters at *Moffet-Wells*, in *Annandale* in *Scotland*, by Advice of her Physicians, for a continual Vomiting, and the *Dolor Nephriticus*, died there in a Fit of Vomiting. Upon dissecting the *Stomach*, I found a *Stone* of the Bigness and Form as in the Figure. The Corner *a*, was almost fix'd in the *Pylorus*, so that the Passage from the *Stomach* to the *Intestines*, was near quite shut up. The Substance of this *Stone* is a little spongy, weighing about 1 ½ Dr. In the Left *Kidney*, I found also a *Stone* of the same Substance, weighing about 5 Dr. and in the *Gall-Bladder* I found several *Stones*, weighing 2 *Drams*.

I am apt to believe, that some extraneous Body gave Origine to that in the *Stomach*, as it frequently happens even in those extracted from the *Vesica Urinaria*: Thus an Iron Tag, a Leaden Bullet, &c. have been found the Kernels of several *Stones*. And that several extraneous Bodies are oft-times found in the *Stomach*, being swallowed over, either wilfully, or by Accident, we have the Authority of *Sennertus* and others. And one Mr. *Cameron*, who some Years ago, in a Frolick, swallow'd Half a Crown, is alive to this Day, and finds no great Inconvenience thereby.

These *Stones* generated in the *Stomach*, excite horrid Pains; but there are scarce any clear Signs by which they can be distinguished from others, except

Stones found in the Gall-Bladder; by Mr. J. T. n. 209. p. 111.

Stones found in the Stomach, Kidney, and Gall-Bladder; by Mr. Will. Clerk. n. 250. p. 95.

Fig. 41.

Lib. Prax. 3. Par. 2. Ser. 1. Cap. XV.

except the Continuance of the Pain; sometimes they are ejected by Vomit; and sometimes they adhere to the bottom of the *Stomach*, of which we have

Lib. Instit. p. a notable Instance in Horstius.
142.

But Stones are also formed in all other Parts of the Body, of which we are assured by manifold Observations and Experience: As in the *Brain, Kidneys, Ureters, Gall-Bladder, Tongue, &c.* and some are voided *per Anum*. But more ordinarily *Stones* are formed in the *Kidneys* and *Bladder*; because these Vessels are more properly designed to separate and contain the *Serum* of the Blood; and for that Reason *Stones* in the *Reins*, and *Vesica Urinaria*, are more troublesome to Persons afflicted therewith, than in any other Part of the Body: 1. Because the Parts are more sensible. 2. Because they stop the Passage for evacuating the *Serum*, that is continually separating from the Blood, and by Consequence distend the Vessels, and so cause horrid Pains.

*Stones voided
by Sieges; by Dr.
Sam. Thresap-
land. n. 170.
p. 961.*

LXXIX. A Carpenter, near *Hallifax*, about 40 Years old, of a strong Habit of Body, and very laborious in his Calling, made a great Complaint to me of the sad Torture he had suffer'd by reason of two *Stones* he had voided by *Stool*, about *Christmas 1684*. He perceived no Disorder in his Body, till within 5 or 6 Days that the first came away; then he began to complain very much of a Pain in the Belly, much resembling the *Colick*; and of a Stoppage in the *Intestines*, not much unlike that in a *Tenesmus*, having frequent Provocations to go to *Stool*, but to no purpose upon Trial. He took little or no Rest in all that time; his *Stomach* retained scarce any Meat or Drink it received; till in the Conclusion one of the *Stones* came into the *Intestinum Rectum*, where it lodg'd for a Day's time; then coming within the reach of his Finger, he drew it out by Force, and then he was presently very well. A Fortnight after that, the other began to move; which occasioned a Pain beyond the former in Proportion to its Bulk; and kept him upon the Rack about 8 Days; during which time there was an absolute Suppression of Excrements; and when the *Stone* came into the *Rectum*, it continued near two Days within the reach of his Finger, with which he could not draw it out by any means; till at length he bent a small Piece of Iron into the Form of a Hook, with which rude Instrument his Servant drew it forth with much ado, and not without wounding the rugous Coat of that Part. After that was gone, he soon recovered his former Condition.

About 7 Years before, the very like Case had befallen him, voiding two *Stones* after the same manner, and about equal Bigness.

*A Bullet void-
ed by Urine; by
Dr. Nath. Fair-
fax. n. 40. p.
303.*

LXXX. *G. Eliot* of *Mendlesham* in *Suffolk*, a pale, middle-ag'd, full-bodied Woman, sorely afflicted for some Years with a Torment of the Bowels, was prevail'd with by a Neighbour, who had suffered much in the like Case, to swallow two fit *Bullets*; where upon she found (as he had done before her) present Ease. But afterwards her Pains returned and increased; and she having many Conflicts for about 15 Years, then applied herself to my Apothecary, *Mr. Gibson* of *Stow-Market*, who administred to her in the Fit a Dose

a Dose of Lady *Holland's* Powder, which she took in Posset-Drink in the Morning, was moved gently by it in the Afternoon, spent that Night in Torture of Body with Vomitings; and next Morning, during the use of the Chamber-pot, together with the *Urine*, there came something from her, which gave a twang against the Sides of the Vessel. The *Urine* being poured off warily, there was left in it a heavy (and to appearance) Gravelly Stone, of a Colour between Yellow and Red, near as big as one's Thumb's End, (as she confidently asserts to me) but making Use of an Hammer, and knocking off the outer Parts of its Crust, they came at a *Bullet* enclosed in it, of a kind of Brazen Colour on the Outside; but cutting a little with a Knife, it proved *Lead* within: Which being discovered, could easily be accounted for. Asking her, if no Enquiry had been made for such a *Bullet's* coming from her before? She told me, that some Days after she took them, the Stools had been slightly examined; but finding neither, they gave over search. She being farther ask'd about the Bigness of the *Bullet*? She told me, it was apparently bigger when she took it, than when she voided it. The State of her Body, in reference to the Stone, being enquired into, she said, that she had, before and since that befell her, been a Voider of abundance of Red Gravel, and particularly, about 3 Years after she took them, she voided a considerable reddish Stone. When I ask'd her about the manner of affecting her Body at the coming forth, she answer'd, 'twas much like a common Fitt of the Stone, only it held her longer, (lasting some Weeks) bow'd her sadly forward, (as a Stone often does in the *Ureters*) provok'd to Vomitings, and particularly she felt it crowd lower and lower from the *Kidney* to the *Bladder* in the Left *Ureter*. Asking her farther, Whether she was sure it came by the Passage of *Urine*, and not by *Siege*? She assur'd me, she was not mistaken as to that. And indeed, the Gravelly Coat, which the *Bullet* hath, shews sufficiently whereabout 'twas lodg'd. Enquiring also, whether the other *Bullet* was come from her? She said, No; for ought she knew, 'twas still in her Body. And as to her State since this Evacuation, she saith, that she hath had ever since Stone-Colick Pains, but none in so high a degree as before.

The main Use I would make of this Instance, is to strengthen a Conjecture I have had a long time, of some other Passage from the *Stomach* to the *Bladder*, besides what Anatomists have hitherto given Accounts of: For that this *Bullet* never came at the *Ureters* through the Veins, Arteries, Nerves, *Lympha-Ducts*, (the only Vessels that can be charg'd with it) is, I think, beyond Dispute. If it shall be said, that Nature, when put to Shifts, finds out strange Conveyances to rid the Body of what is extraneous and offensive to it, because many Instances are known making that good; yet I think it not so pertinently urged, forasmuch as some other Instances seem to side with it, which cannot be taken off by the same Evasion, viz. Many do find, that drinking 4 or 5 Glasses of *Rhenish*, (for Instance) within less than a Quarter of an Hour they shall have a strong Lift to make Water, especially if the Body hath been agitated. Now that it should pass through the

Lacteals, Veins, Heart, and Arteries, and be strain'd from the Blood in so short a time, is to me scarce conceivable.

But surely this shorter Passage (where-ever 'tis) is as natural as that by which it should have gone, had it stay'd longer in the Body: Not to say, how little it favours of the Rankness of the *Kidneys*, and how much it resembles that which it was before 'twas taken into the Body. And methinks, the Conveyance of the *Milk* into the *Breast*, hath much Affinity with this of the *Urine* into the *Bladder*; the sudden Pressing whereof into the Paps after the Nurse's drinking ordinary Milk, could no more be explained by the ordinary Doctrine of *Circulation*, than this of the *Urine* into the *Bladder*, till the shorter Cut was hit upon by the *Ductus Thoracici*; though ordinarily it may be strain'd from the Arteries, as the *Serum* also in the *Kidneys*; only in a Milk-flood Nature finds some other Channel there, as here in a Water-flood.

A Shell found
in the Kidney;
by Dr. Robert
Pierce. n. 171.
p. 1018.

LXXXI. A Gentlewoman (at *Bath*) about 28 Years of Age, very fat, and corpulent, after having been long troubled with frequent, and sometimes violent Vomitings, fell at length into a *Fever*, and died in few Days, and on a sudden. I opened the Body, and quickly found what might account for her long Vomiting (and perhaps her *Fever* and *Death* too) *scil.* an Ulcer in the *Pancreas*, which had sphacelated some Part of the *Stomach* and *Bowels* that lay nearest to it. Her *Kidneys* were covered with a prodigious Quantity of Fat; which removing with my Hand, and reaching one of the *Kidneys*, I felt something prick my Finger in the lower Part of the *Kidney* where the *Ureter* is inserted: I presently concluded it to be a *Stone*, and took it out, with an abundance of Mucous Bloody Matter about it. I found not so much as *Gravel* (much less any *Stone*) in either of the *Kidneys*. When I had washed off the *Mucus* that was about the supposed *Stone*, I found it to be a small *Shell*, very finely wrought; in the Hollow of it, there was a Mucous Slimy Matter, not at all unlike the Substance of a *Snail*, as to Consistence, but of a Bloody Colour.

Fig. 42.

Fig. 42. Represents this *Shell*, somewhat magnified. Those indented Checkers are every other a little depressed and elated; and very exactly wrought. There are 6 or 7 Spiral Lines, or Rounds, in the *Turban*.

A Stone grown
to an Iron Bod-
kin in the Blad-
der, by Dr. M.
Lifter. n. 168.
p. 882.

Fig. 43.

LXXXII. This *Stone* was cut out of the *Bladder* of a Boy at *Paris*, by M. *Colo*. The *Iron Bodkin*, to which the *Stone* grew, and which passes through the Middle of it, had been thrust up into the *Bladder* by the Boy himself, about 2 Years before the Incision.

A Bodkin cut
out of the Blad-
der of a Woman;
by Mr. Proby.
n. 260. p. 455.

LXXXIII. *Dorcas Blake*, (in *Dublin*) a Full-bodied Sanguine Maid, about 20 Years old, was much troubled with a Hoarseness last Winter, for which she was very desirous to take a Vomit; but her Friends not consenting to it, she endeavoured to provoke one, Jan. 5. 1694. by thrusting her Finger into her Throat; which not answering her Desires, she drew an *Ivory Bodkin*, of 4 Inches long, out of her Hair, and thrust the small End forward

Fig. 22.

Fig. 23.

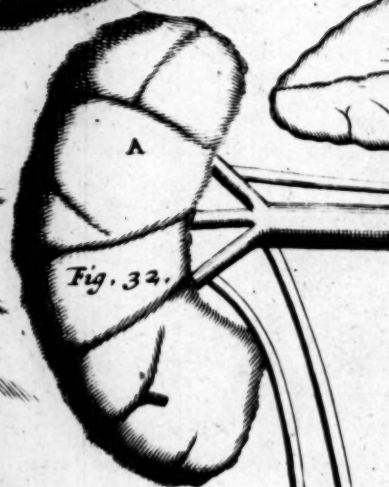
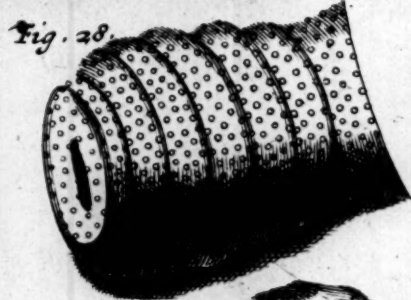
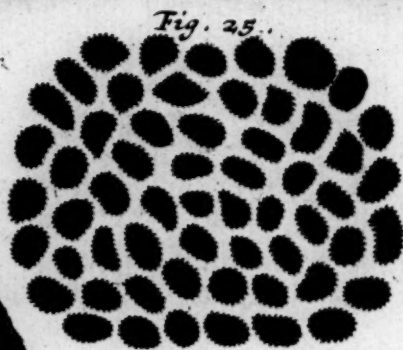


Fig. 31.



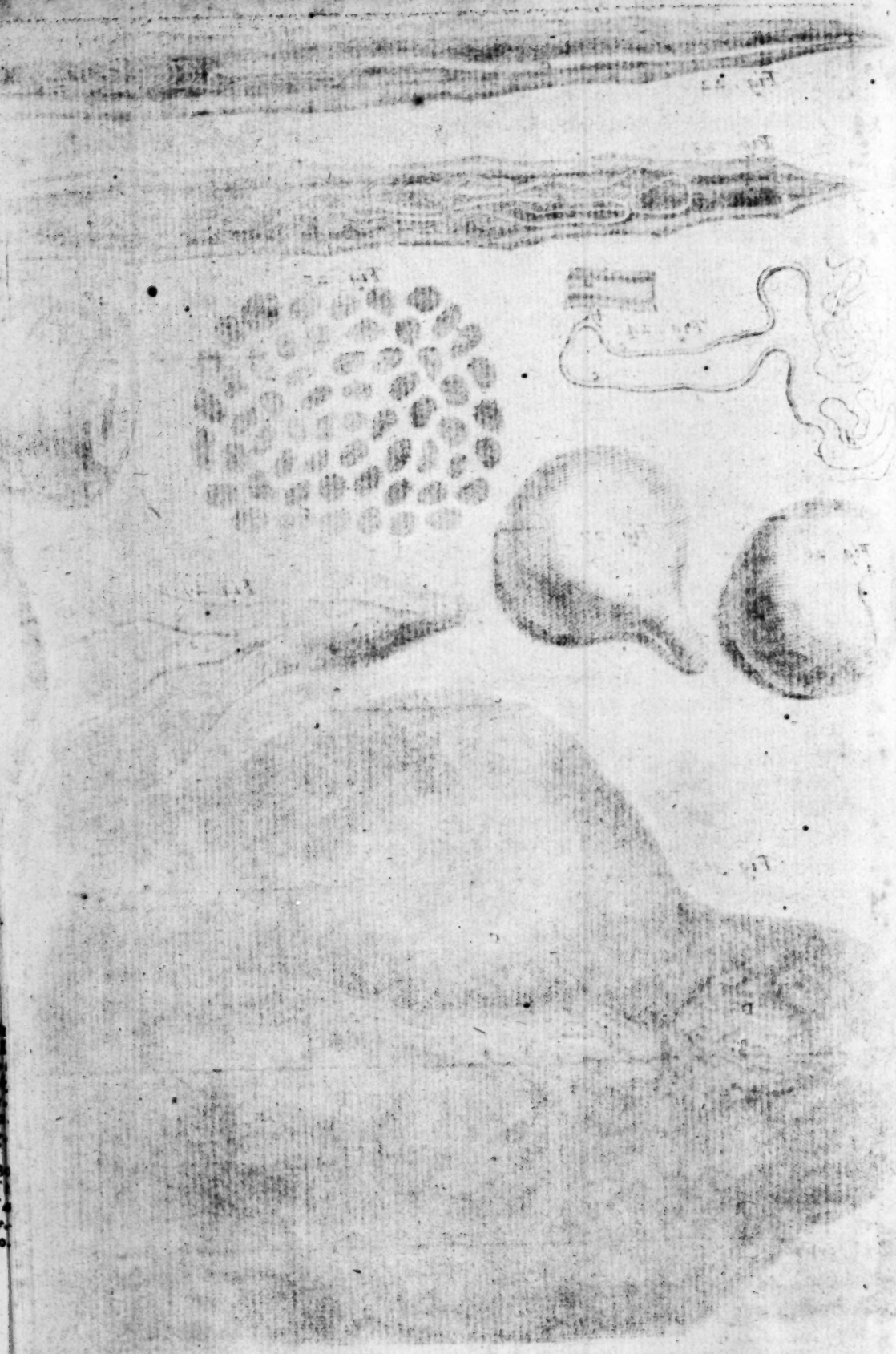


At
in the
by Dr
Piero
p. 10

Fig.

As
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Litter
p. 88
Fig.

AB
out of
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by Mr.
n. 260.



ward into her Throat, upon which she heav'd so often as put her out of Breath, and oblig'd her to stand upright to draw some Air, which she did without taking the *Bodkin* out of her Throat, and at that instant it slipp'd out of her Fingers, and pass'd into her *Stomach*. She found no immediate Inconvenience; but the next Day, about Noon, she felt a sharp pricking Pain in the Right Side of her Belly, lower than the Navel; and towards Evening she felt the Pain nearer her Right Groin than before, which oblig'd her to go to Bed, where she lay restless all that Night, by reason of the excessive Pain. Jan. 7. a Midwife searched her, and said, she felt the End of the *Bodkin*, but thought it was in a Gut. Jan. 8. at Night, she sent for me. In searching her by the *Anus*, I could not find it; but putting my Finger into the *Vagina Uteri*, I felt the *Bodkin*: And because she complained of a Difficulty in voiding her *Urine*, I made use of my *Catheter*, and felt it as I conceive in the *Bladder*; but immediately trying a 2d time, I could not find it. Within a Fortnight after, it was very plainly to be felt: And about 10 Days after this, (her Body being duly prepared for the Operation) I attempted to extract it, after the same manner as I do *Stones* from *Women*. But having introduced my *Forceps* into the Neck of the *Bladder*, and very readily taken hold of the *Bodkin*, I could not move it. I then pass'd in my Finger thro' the Dilatation into the *Bladder*, and try'd to bring the whole *Bodkin* into the *Bladder*, but could not; nor could I turn it one way or another, but round like a Spindle, the smaller End (as I imagine) resting upon the *Ischium*. Finding all my Attempts to be fruitless, I despair'd ever to effect it this way, which made me desist from farther Trial. But after some time, her Pains increasing, she prevail'd on me by her daily Importunity to attempt the extracting of it in the manner of the *Higher Operation* for the *Stone*, which was as follows; Dr. Madden, Dr. Molineux, and Dr. Smith, being present. Having placed her in a convenient Posture, I put my Finger into the *Vagina Uteri*, and felt the *Bodkin* lying close to it on the Outside; whilst I held my Finger there, I press'd with my Left Hand above the *Os Pubis*, where I felt the Head, or thickest End of the *Bodkin*. I then remov'd my Right Hand, and desir'd Dr. Smith to put his Finger into the *Vagina*, as I had done before, and press hard against the *Bodkin*; which he did, and held it very firm and steady, whilst I made an Incision about an Inch and a half in Length on the Outside of the Right *Musculus Rectus*, till I came to the *Bladder*. I then pass'd my Fore-Finger and Thumb into the Wound, and got hold of the Head of the *Bodkin*, (the Substance of the *Bladder* only being between) upon which, with a small crooked *Bistoury*, I cut the *Bladder*, and by gently pressing my Finger and Thumb, the *Bodkin* slipp'd out of the *Bladder* between them, by which I very easily extracted it. I dress'd the Wound and put her into Bed, and in less than a Month, by God's great Blessing, she was perfectly cured.

June 10. 1695. The young Woman went before the Lord Mayor, and made Oath, that the above Relation is true in Substance, and that she did swallow the *Bodkin* therein mentioned.

The *Bodkin* was cut out of her *Bladder* that Day 9 Weeks that she swallowed

lowed it. There was but half of the *Bodkin* in the *Bladder*, which was incru-
stated with a Gravelly *Calculous Matter*; the other half was out of the *Blad-*
der in the *Pelvis*, the Point resting upon the *Ischium*.

A Stone from
the Bladder, with
a Flint in it; by
Dr. Geo. Garden.
n. 266. p. 689.

LXXXIV. A Boy of 5 or 6 Years of Age, near *Aberdeen*, was cut for a
Stone; which being by Accident broke a little, there was seen within it a
Flint-Stone shaped like to that of a Pistol, with the *Calculus* crufted about it.
I saw this *Gravel-Stone* with my Eyes, having the *Flint* in one side of it, but
crufted above. That the *Flint* has not been formed in the *Bladder*, but that
this might have been occasioned by the Boy's swallowing of the *Flint-Stone*,
seems probable from another strange Instance of a Man in the same Coun-
try, his voiding with his *Urine* a small *Pistol-Bullet*, crufted over with *Calcu-*
lous Matter, after the same manner.

A Pistol-Bul-
let crufted over,
voided by Urine.

A Stone from
the Bladder, with
Hair growing on
it; by Dr. Jo.
Wallace. n. 266.
p. 688.

LXXXV. I had an Account of Sir *Will. Elliot*'s piffing *Hair*, from Sir *Ar-*
chibald Stevenson and Dr. *Pitcairn*, his Physicians; and after his Death I saw
the Stone that was taken out of his *Bladder*, which was about the Bigness of
a Goose-Egg; the Stone was hard and heavy, and for the most part covered
over with a Scurf, not unlike the Lime-mortar of Walls, and in the Chinks
of the Scurf there were some *Hairs* grown out. 'Twas thought the other
Hairs he pissed in his Life time, which were a great many, and some of an
extraordinary Length, did grow out of that Stone; because when the *Hairs*
would hang out of his *Penis*, as they did frequently to his great Torment,
they were obliged to pull them out, which was always with that Resistance
as if pluck'd out by the Root.

A Stone in the
Bladder of a
Dog; by S. . .
n. 84. p. 4094.

LXXXVI. A pretty *Spaniel*, (in *Italy*) 2 Palms and a half high, and an
excellent Setter for Quails, being kept tied, as such *Dogs* are wont to be,
would rather have burst than urine or dung in the Place where he was
kept. By reason of his aptness to bite, he was cut when he was five
Years old; and two Years after that, he began to *urine* with much Difficul-
ty. Whereupon, as often as he was let loose, he ran presently into the
Garden and fell to eat of *Pellitory of the Wall*, and *Fig-Leaves*; which *Mat-*
thiolus and others observe to provoke *Urine*, and cleanse the *Reins*. This
Disease continu'd upon him for 5 Years together, sometimes with that Vio-
lence, that his Master had him fying'd, and anointed with *Oil of Scorpions*,
and used other Remedies to help the poor Creature. At length he died at
12 Years of Age; and being opened, there was found in his *Bladder* a Stone
weighing an Ounce, of an irregular Figure, white, yet here and there
with some reddish Specks; and in the Bottom of the *Bladder* was found store
of small white *Gravel*; and in the Mouth of the *Urinal Passage*, a Stone as
big as a great *Pine-Kernel*, white and tender. The rest of the Body was all
swell'd.

A Stone fast-
ened to the Back-
bone of an
Horse; by S. . .
ib. & Ph. col. B.
p. 195.

LXXXVII. There was lately a Stone of a very extraordinary Bigness
found in the Body of a *Spanish Gelding*, about 13 or 14 Years old, which di-
ed in the *Academy* of M. de *Barnardy*; the Weight of it being 4 Pounds, of a
roundish

roundish Figure, a little flatted; its longest Diameter was 5 Inches, and its shortest 4: It was of the Colour of an Olive, but a little inclining to a Brown, marked with several red Spots resembling coagulated Blood; radiated circularly with black and white Veins and Waves; but for the rest of it, so delicately polish'd, that it reflected the Images of the Objects about it. It was found envelopp'd in a Membrane of Fat, and fastened by two Ends, to the *Spine* of the *Back*, near the *Kidney*: It was more than 12 Hours after the *Horse* was dead, before it was taken out of his Body, when it was found very hot, though the Body of the *Horse* was quite cold; and it retain'd a considerable Heat about 6 Hours after it was taken out.

LXXXVIII. Immenſæ Molis Calculus haud ita pridem in Villa Lambethana, ex Equi Visceribus exemptus, pondere erat 4 Lib. & totidem Unciarum, magnitudine quasi Capitis Humani, & Figura non multum abſimili, Oblonga quidem, non tamen tam Rotunda quam Sima. Ille qui Calculum exemerat, Partium opinor earumque Situs ignarus, aſſerit illum inventum eſſe inter *Veficam* & *Inteſtinum*: Et tamen fortasſe non totus à Scopo & rei Veritate aberravit. Calculus quippe ex una parte Planus erat & Lavigatus, utpote per quam *Urina* continuo curſu non ſine Luſta & Nixu, propter anguſtum illi relictum locum, colata pertranſierat; ex altera parte, quæ *Veficæ* incumberet & adhæreret, Aſper & Rugoſus, Lapidem Bibulum referens, qui cum mole & pondere quotidie creſceret, inſtar Lapidis Molaris totam tandem corruerat teneram *Veficæ* Tunicam, ut ejus nullum prorsus maneret Veſtigium. Et forte ſi quis attentè adverteret, ipſum Fimum propter pondus *Inteſtino Recto* incumbens in aliam, quam quâ ſolet, Figuram compreſſam etiam cum difficultate excerni notaret. De Equo, Dominus, ſub quo per 12 Annos fido Obſequio & Labore meruerat, hæc retulit; Erat Staturâ 15 Palmarum, deſtinatus Pannis vehendis & revehendis, nunc Sinceris, nunc Coloribus infectis. In iis, quorum nulla certa conſtat ratio, omnia ſuſpecta habentur. In Pannis Tingendis plurima petuntur ex Mineralium Familiâ, *Calcanthum*, *Alumen*, variique *Sales*, & alia etiam cognatæ fortis ex Animalium & Vegetabilium Claſſe, quorum etiam hic frequens uſus eſt. Panni his rebus infecti, & calentes ex puteis extracti in Equum coacervantur, qui ſub hoc onere gemit & fatiſcit. Hic fortasſe non ineptè quæri poteſt, annon ex his tam arcè preſſis & cohærentibus ſubtiliora exeant Effluvia, quæ furtivâ Inſpiratione attracta, aliquid ſaltem faciant ad *Calculi* Concretionem, & particulas *Salinas* Glutine quodam congregent & uniant? Non parum Momenti habet in fide huic conjecturæ faciendâ, quod Liquor iſte, quo *Tinctores* ſapius utuntur, Spiritu *Vitriolico* Fœtus concretionem maxime promover. Quod videre eſt in pluribus *Angliæ* locis, ubi Spiritus iſte obtinet, qui quicquid illi obvium fit arripit, Ligna, Teſtas, Paleas, Cruſta Lapidea involvit. Magna ſæpe fiunt ex minimis, diuturnâ præſertim conſuetudine repetitis. Niſi hodiè exoleſceret prorsus Opinio, quæ diu apud Antiquos immota ſterit, *Renum* ſcilicet Calorem eaſdem in *Calculo* faciendò partes habere, quas Ignis habet in Lateribus Coquendis, hic imprimis valeret, cum *Equus* ſub Monte quidem Pannoſo, etiam *Dorſi* Regioni impoſito, quotidie laboraret, & anhelaret.

Tam

A Stone taken
out of the Belly of
a Horse; by Dr.
H. P. Ph. Col.
N. 7. P. 191.

Tam religiosè olim cavebant Veteres, ne intensus Calor *Renēs* adureret, ut *Lumborum* Regionem laxo solummodo Linteo defenderent, ita ut Dorsum non Pectus fenestratum gererent. Affirmat *Salmafius* se plerisque vidisse qui *Calculus* in *Renibus* solummodo contraxerant, quod *Mensa* adsiderent obverso ad Ignem Tergo. Alio quidem respectu *Renibus* imprimis nocet fervidior *Æstus*, qui tamen *Calculo*, nisi Materiam inveniat quæ apta sit concrefcere, suum haud confert Symbolum. Ab Itineribus per aliquot Annos *Equus* desueverat, ita ut nec *Ephippium* nec Sessorem sine summa lucta & protervia admitteret, quasi rectius & levius federet solitum & quotidianum Onus, novum autem maximè irritaret; aut provido Sensu præfagiit, si ad Iter se accingeret, Onus quod jam quasi in Pulvinar, dum pedetentim pergit, quietum reclinabat, citioris cursus Exagitatione graviores Cruciatu, & Molestias daturum. Id quod sæpe videre est in Homi-nibus *Calculus* Filamentis quibusdam in *Æquilibrio* suspensum diu sine magno incommodo gestari, illis autem vehementi aliquâ Luctâ & contentione ruptis in collum *Vesicæ* prolapsus, unde acerrimus in tam tenera & sensili Parte Dolor, quam misera Mors excipit. Erat insuper *Equo* pro Pabulo quotidiano Fœnum aridum; herbosis & liberioribus Pascuis per aliquot Annos haud raro aut nunquam gaudebat, in quibus aut commune remedium inveniret, aut fortasse singulare aliquod seligeret, cujus Vim & Virtutem Sensus & Experientia comprobassent. Quidni enim eandem cum aliis Animalibus ei demus Solertiam? *Canis* Cibis distentus & gravatus sedulo discurret, & inter mille alia peculiare suum quærit & eligit Gramen, quo Vomitu provocato *Ventriculum* Onere suo liberet & relevet; *Cervus* Sagittâ fauciatus ad suum statim festinat probatissimum in hoc casu *Dictamnus*; *Felis* sive male sive bene se habeat, *Nepetâ* suâ se relevat & recreat, quæ ideo de suo Nomine *Cattaria*, & *Mentha Felina* nuncupatur. *Equus* etiam hic bis quotannis Verno scil. & Autumnali tempore macrescere, & in Partibus posterioribus præcipue ita hebes & languidus fieri solebat, ut ægre & vix Pedes expediret, & post se traheret; Gravi scil. Onere oppressi fatiscunt Spiritus. Ita sæpe videre est Membrum aliquod graviore Ictu contusum, & Spiritibus destitutum, *Atrophiam* tabescere, & inutile fieri pondus. Octo autem aut 10 ante Mortem dies *Urinam* minime reddidit, *Calculo* scil. ita omnem Capacitatem opplente, ut nullus daretur *Urinæ* Transitus. In Solum jam se projicit, se verberat, volvit, revolvitque, Terram Pedibus proscindit, & omni, quâ potest vehementiâ, acutissimi Doloris exprimit Sensum. Sed quod majus adhuc mirum est, per totum illud tempus, quo *Urina* non profluxit, etiam oblatam Aquam pertinaciter aversatus est. Quasi ex ipso Naturæ Instinctu sentiret Aquas, si non transeant, altiores assurgere, & longe graviora creare Tormina.

A Stone in the
Bladder of an
Ox, by Dr.
Johnston. n. 101.
p. 2.

LXXXIX. 1. An. 1671, The Bladder of a fat Ox being blown by a Butcher's Servant, in *Pomfret*, there was something observed sticking to the Inside with a dusky Froth. Keeping the Bladder half blown, the Butcher's Son, who first discovered it, knocked with his Hand on the Side and the Bottom of the Bladder, to make it settle to the Neck; and by shaking and

and squeezing it, got out the Froth, and about 200 little Globular Stones of several Sizes. He rubb'd the slimy Froth from them, and they appeared of a duskyish Yellow Colour, and smooth. When dry, they were like Seed-Pearl, but more smooth, and of a perfect Gold Colour, and so continued. View'd in a Microscope, they appeared polish'd, and without any Rugosities. The Figure in most was spherical; in some a little compressed; the Colour like Burnish'd Gold. I broke one or two of them with some Difficulty; and I found, by the Microscope, that it was only a thin Shell that was so orient and bright, the inner Side of which Shell was like unpolish'd Gold. The inmost Substance was like brown Sugar-candy to the naked Eye, but not so transparent. The Taste was not discernable. In Spirit of Vitriol they shrunk much and wasted, but continued their Colour, (possibly by reason of the outward Skin, which, it seems, in these was as difficult to dissolve as in true Pearls); likewise Aqua-fortis would corrode and dissolve them tumultuously.

2. I did persuade myself at first, that these Stones were some Insects Eggs; but afterwards, when I had read that Account of several Stones found in other Animals which Dr. Wedelius has published in the *German Ephemerides*, An. 1672, I was induc'd to believe them Stones indeed.

By Dr. M. Lister. Ibid.

XC. 1. *Margareta Laurwera*, nostra Concivis, modestè vivens, Anno Periodi suæ 21, qui Anni fuit 1678, tempore Verno Menstruis deficientibus incidit in varios Cruciatos acerbissimosque Dolores, hinc inde jam supernas, jam infernas, jam Dextras, jam Sinistras Corporis Partes infestantes, variis subito sapius ad Palmæ Latitudinem erumpentibus Vesicis, Limpidâ plenâ, ardentissimæque flagrantibus, ut Ignem Sacrum subesse putares; & cito nisi dissecarentur, evasit Dolor intolerabilis, mentemque deturbans. Moxque sedatis ex unâ, fit Eruptio ex alterâ parte. In his mitigandis & curandis cum detenti in Nosocomio Clementissimi Magistratus (*Insula dicto*) omnem operam cuncti navaremus, Causam tanti mali ad Acrimoniam Lymphatici Humoris singularem, & vim illi in Glandulis subcutaneis Stypticam impressam ideoque coagulatum resfluere non potentem referentes, quæcunque Ars & Methodus docent in Demulcendo, Dissolvendo, Avertendo & Vacuando isto Humore adhibebamus, pleraque frustra; dum tandem ratione & analogiâ ducti ad Pryalismum Mercurialem confugimus, cujus effectus respondit: Sicque post Octimestrem Curam Mense Martio An. 1679. è Nosocomio viribus restitutis dimissa ad usum Seri Lactis Caprilli Chalybeati relegabatur.

A prodigious Number of Stones voided by a Woman at Bern in Switzerland; by Dr. Sigismund Koenig. P. Col. n. 3. p. 68.

Ab hinc integrè valuit ad tertiam Januarii An. 1680, omnibus Functionibus suis incumbens, quâ ipsa Vesicarum Eruptione iterum vexari, auxiliiatricesque ac beneficas manus summi Magistratus in Nosocomio expetere capit, quæ ejusdem quintâ porrectæ, omnis cardo in eo versabatur, ut præcedenti Methodo de Pryalismo inmitteremur; sed omnibus ante opus esse voluit ad ejusmodi majorum & arduorum Remediorum usum Corpus disponere, in quod intenti non tamen mora Catharsi, fit momentanea à Circumferentia in Centrum, ab exterioribus in ima Penetrantia 15. dicti Mensis, Humoribus reductio; subito omnes evanescunt Vesicæ, adeo arcte Cuti se infigit Cuticula, ne

ne Vestigia præcedentium permanserint, ex qua veloci Revulsione cum nihil boni Ominatus, etsi ægrota Deo Hymnum cantaret pro Divina subitanea è fummis Cruciatibus Liberatione, sed decubitus acrimie Humorum in Viscus aliquod Nobile veritus, licet 5 dies *ὑποελας* summam Ægra percipiebat, nusquam tamen destitit Discutientia & Diaphoretica temperata propinare Recidivæ vel majoris Mali metu.

Evenit 20. hujus lerna malorum & omnis Judicii Illusio, querebatur Dolorem *Lumborum, Vesicæ, Perinæ & Inguinum*, cum Virium Prostratione, Inappetentia, Nausea, notabili Inflammatione, & Sanguinis *ὑπερπλῆξ*, Retentione *Urinæ, Pulsu* celeri & intercepto, unde *Nephritidem* concludere erat necesse: Quapropter Sectâ Venâ præparatur ex *Nephriticis* & frigidis Seminibus blanda Emulsio, injicitur Clisma ex mollientibus frigidis Paregoricis, mox injectum, omnium stupore, Horæ intra quadrantem rejicitur per Os, repetitur idem, & superne rejicitur idem cum quantitate instar *Tophi Lapillorum* ad *Unciâ* Semis, nullis unquam Excrementis permixtis. Fiunt Infusus, Semicupia, applicantur Vesicatoria Artubus ad Humoris noxii Revulsionem, Anodyna & resolventia *Lumbis & Pubi*; repetitur ob æstuantia Viscera Venæsectio, Sanguis apparet rubicundus, insipidus, cum paucis Sero subflavo, citò concretus; remittit Febris; propinantur ex Pulpis decocta Solutiva, quæ tamen cuncta cum Jusculis aut aliis assumptis Vomendo, quantitatem *Lapidum* mox duriorum instar *Silicis*, & Frustra Corticum *Marmoris Albi* simillima durissima, rejecit. Iterum transitur ad Clismata pari ut dictum Successu per superiora, nisi quod quantitas *Lapidum* excretorum augeretur, & ut priores exigui Pisorum instar, hi *Avellanas* minores Noces, quas tamen mox excedebant, magnitudine æquabant. *Vesica* summo Dolore mejendique desiderio premebatur, applicato *Cathetere* ne Gutta fluxit, inhærebat ipse velut Glutini infixus, ut vi retrahi debuerit, nobisque tangentibus *Vesicam* Muco repletam declaravit. Suspicabamur non immeritò in *Renibus & Vesica* Glandulisque *Mesenterii* generari *Calculos*, prout in *Ventriculo & Intestinis* *ἀντρίξ* docuit. Venter in aliquam, non tamen nimiam, molem cum oppressione Præcordiorum & spirandi difficultate intumuerat, acutissimum Dolorem pungentem & lancinantem in Regione dextri *Renis*, & Sinistri *Hypochondrii* ferens, Frigor invicem allidentium *Lapidum* vel admotâ manu vel citato Vomitu audiebatur, ac in enixu sæpius observatum *Lapillos* fractos ab aliis intus restantibus avulsos esse; sed quod maximum est, toto durante Morbo, Ægra *ὑπερπλῆξ*, benè Colorata, facie florida, mansit. Nitebamus itaque omni nervo Humorum Concretionem impedire, & Concretas dissolvere, varia *Menstrua* quærentes in Volatilibus Martiatis, & Urinosiis, sed extra *Spiritum Nitri*, in Usus vocatum, nullum Dissolutione efficax esse potuit; & his juxta alia Auxilia adhibitis, ut injectione in *Vesicam* ex variis Decoctis, tam de Mineralibus quam expressis Plantarum Succis, *Perficariæ, &c.* ad Mucosâ illius substantiæ in *Vesica* Dissolutionem, nil tamen obtinere; sed mox Anodynis ob exquisitissimum Sensum, mirum in isto Muco, concurrere necesse habuimus. Tandem 2. & 12. Feb. extrahebantur *Cathetere* circiter *Urinæ* Viridis & Crassæ *Unciæ* 4; Cibus abhinc paucus, nullaque Sitis urgebat. Interim cum unum alterumve Cochlear Juris Carnium vel Hordeati,

Hordeati, aut alterius forbilis Medicamentive caperet, repentè Reromit de die bis, ter, *Lapillorum* circiter *Unciam Semis* ad *Drachmas* 6. plus minus, ad 14 usque. A qua ad 16 *Jun.* elapsos 4 Menses, nec edit nec bibit, sed quam primum solum Cochlear Brodii propinaretur, statim Vomitu Cruento expuit *Lapillorum* majorem quàm antea copiam, ut Cruciatu contra ipsius Voluntatem irritando omni offerendo Cibo Potuque abstinere hoc tempore debuimus. Mansit itaque *Ægra* totum Quadrimestre Abstemia, non Edens, non Bibens, non sumens Remedii quicquam, quam quinto sextove die Cochlear exiguum Olei *Amygdalarum Dulcium Spiritu Nitri* impregnatum, quod optimum solvens in hoc affectu repertum, *Ægræ*que supra alia, Remedii genus acceptum erat, ut *Uncias* novem ad decem hoc integro tempore adsumpserit. *Alvus* hætenus Constricta manens, quum varie Clymatibus tentaretur, semper singula Sursum rejiciebantur, *Lapillis* varii generis, Albicantibus, Ruffis, Griseis, Asperis, Lævioribus, Mollioribus, Durioribusve magna mole comitantibus, mox homogeneis uniusque Substantiæ, *Tophis*, *Silicibus*, Cruftis *Marmoreis*, mox heterogeneis, compositis ex *Cemento* cum *Silicibus*; horum alii cum Cruore, alii Muco Chyloso obducti, alii omni aliena admistione immunes excernebantur; Dysuria premebat, sed non nisi de Decima ad Duodecimam mane, licet tertia quavis die *Catheter* injectus, ad *Uncias* duas, vel tres pro vice ad summum, *Mucosæ & viridis Urina* elici possit: cum alius Liquor, quam qui per Clysmata, suppeditatus non fuerit. Attamen his intermediis nullo immutato neque in Victu, cum nullum sumpisset, neque in Remedio, cum aliud tolerare non posset, & *Urina* 6. *April.* solveretur, *Unciæ* tres fluxerunt Cæruleæ Translucidæ & Tenues, saturatè Coloratæ, nec vero ultra durarunt; siquidem 17. *Urina* iterum Subviridis & media parte dissoluto Sabulo Griseo impleta Matula apparuit, unde dissolutio *Tartari* Argumentum mox evanescens, cum Symptomata Dolorque adeo ingravescerent, ut Mentem sede moverent, hinc Deliria, mox Stupor, Risus & Cantilenæ, Febris absque Sensu, mox atrocissimus *Lumborum* Dolor, ut de Punctione conquerenti si Cultellus *Ægræ* admissus fuisset, ipsa intrudisset. Tandem his Symptomatibus, perversis Capiti, rati sumus, quocunque modo illud Corpus movere, quapropter *Gr. j.* *Mercurii Vita* in Aqua frigida fontana soluti, 22. *Aprilis*, ut & *Gr. iij.* 2. *Maii* propinavi, non alio Successu quam quod *Drachmas 7 Lapillorum* duobus motibus evomuerit. Inde Octavâ *Mercurii Vivi* in tanta *Alvi* Constipatione *Uncias* quatuor, & ad solutionem *Tartareæ* Materiæ, & excitandum *Ptyalismum*, ut & 10. ejusdem, *Uncias* 6. propinavi, sed præterlapsus *Mercurius*, *Anum*que excidens, partim in Lecto, partim in Hypocausto, recolligebatur, cujus quantitatem per *Intestina* circulati mecum reservo. Quid ultra? Sic Vita agebatur Abstemia ad 16. *Junii*, qua *Intestina* Aquâ frigidâ eluere magna quantitate, in quo *Sal Polychrestum* solutum, statui, duas horas Lecto me applicui, de quadrante in quadrantem *Uncias* 6 propinando, sic ut *Libras* 3 Fontanæ biberit, Os ipsi comprimens, Vomituque cohibens effeci, ut sub Vesperam subsequuta sit crassissimorum juxta & Durissimorum *Alvi* Excrementorum Dejectio, ad metum Rruptionis tantopere *Anum* distendentium, sic quod integris 4 Mensibus variè & incassum Remedii tentatum, una Aqua Fontana

omnia solvit. Hic *Deliria* remiserunt & *Appetitus* resuscitatus: Ergo ad *Aquæ Simplicis Acidularumque Usus* Balneaque transgressum, tertia Die omnino reluctante iterum *Natura* abstinuimus. Interim in *Novembrem* *Alvi* dejectio 5, 6, que Die pauca sed libera erat intercidente Vomitu, adeo ut *Calculi* jam supernè & infernè dejicerentur, tantæ magnitudinis sæpius unus alterque *Drachmas* duas non modò ponderabat, sed excedebat, quorum copia penes me; & facile conjicere est non absque Cruore, Asperos illos & Acuminatos *Lapillos*, summoque Dolore dejici potuisse. Hoc intermedio tempore, *Septembris* quippe Mense, cum ab eo quo rursus Cibum licet paucum caperet, Remediis Aperitivis, Diureticis, Emmenagogis, ac Diaphoreticis, non destitissimè, *Menses* ardentesque *Vesicæ* quales prius erupere: Unde *Spes salutis* & *salutis* affulsit, ni cito omnia evanuisent hætenus irreconciliabilia. Cumque ab hinc ad quintam *Novembris* *Natura* in sua *mutabilitate* nihil immutasset, *Alvus* iterum constipari, *Cordis* *Vires* opprimi, omniaque inversa viderentur, & ipsa prius in *Intestinis* recondita *Excrementa* fursum rejicerentur, *Spes* omnis convalescentiæ cessit, sed *Divinâ* *Gratiâ* motus hic non nisi quinta, nona, & quinta-decima *Novembris* contigit, dum Decocto Solutivo ex *Pulpis* *Natura* immutasset; reducta in priorem Statum *Alvo*, *Urina* semper suppressa, cum summa necessitas urgeret, 4 *Februarii*, An. 1681. injectus *Catheter* nihil eduxit, sed mox expetita *Matulâ* *Ægra* *Urina* Subviridis & fæculentæ nixu Parturientis omnium admiratione capta *Lib.* 8. absque ullo tamen *Calculo* eminxit; à quo *Vesica* planè reclusa, loco *Descensus* altero tertiove die *Urina* graveolentis quantitatem *Unciarum* iij. vel iv. ad 16 *Maii*, ore dejecit, A qua ad 2. *Calend. Octob.* cum Balneis Fontanæque largo Potu, *Nitri Spiritu* permixto, uteretur, res eo devenit, ut *Facie* florida incedere queat, modice comedat, *Urinam* singulas Claram, Subflavam, cum tenui *Hypostasi*, aliquando *Mucosam*, & *Cruentam* ad 3 iij. vel 5 v. *Album* vero 4 die sed paucam duramque deponat, subinde Vomat, sed minorem longe quàm antea *Lapidum* quantitatem. Interim quod *Onus* *Natura* *Oesophago* excreverat, nunc quoque *Vesica* sæpius *Acutissimum Lapidum* excernendo reddit; *Abdomen* aliquantum, duritiæ in *Sinistro Hypochondrio*, *Dextraque Lumborum* Regione dolente remanente, Tumens, Contrectatum, Obtusum Strepitum allidentium *Lapidum* edit.

vi. 181. p. 94.

Ab eo tempore *Ægra* nostra moderatè vixit, sat bene *Naturæ* *Functionibus* in Excipiendis & Excernendis occupatis, ad decimam octavam *Aug.* 1682, qua Torqueri, Nauseaq; & Singultu absque tamen Vomitu agitari cœpit: dato *Cardiaco* cum *Spiritu Nitri* *Dulci* ad 29. dicti *Mensis* cessarunt *Symptomata*; hac vero superioris & inferioris *Ventris* *Cruciatibus* summis angî, in *Latera* volvi, *Respiratione* impediri, *Hystericu* *Paroxysmo* infestari; cum *Ructibus* *Cordis* *Palpitatione* & *Oscitatione* visa; Occurrebatur *Anodynis* & *Antispasmodicis* (omissis *Clysteribus*, quorum *Usus* *Ægra* ob *Intestinalis* motus *Inversionem* valde horrebat.) Succedebant *Expansiones* & *Jactationes* *Artuum*, *Motus* *Convulsivi* totius *Abdominis*, *Constrictio* *Musculorum* *Laringis* & *Faucium* cum *Aphonia*, tandemque Parturientis Dolor Sibilo alto se dictitans, quo contractis omnibus *Membris*, *Alvo* dejecit insequenti 30. *Calculum*; Cruore conspersum; cujus *Enixum* sequebantur altera die duo minores longe,

longe, cum Hæmorrhoidali Fluxu, dilaceratis Vasis: post hac instar Puerperæ habita, Jusculis restaurata, Remediis sublevata, convaluit, intraque Septimanas paucas, resoluta jam quasi Natura, ad Actiones obeundas vires collegit.

Hæc rerum Tristis Facies & Vicissitudo, hic Ægræ Status, ab ultimis præteritorum tolerabilior, in Dolorificum versus: *Calculi* non tantum majoris Ponderis, sed & durioris Substantiæ, valdeque Angulosi, nec singulis Digestionibus, sed velut in quadam Matrice maturescentes abrupti pelluntur tertiâ quartâve Septimana Infernè, nec ulterius Supernè excluduntur: *Alvus* prius libera demum astringi incipit, & una alterave à Constrictione Die *Lapidem* parturit: *Urinam* è *Vesica* reddit paucam, Potui in quantitate non respondentem, variam, plurimum crassam & turbidam, quæ raro Supprimitur, Suppressam emingendo antecedit *Calculus* *Fabæ* magnitudine majoris, Angulosus, cæterisque per omnia similis: Et quod antehac per intervalla, nunc quotidie contingit, mane dum *Urinandi* motus urgeret, quantitate aliqua fluente per *Vesicam*, prius, nullo vel exiguo Intervallo, altera Vomitu decedit ad *Uncias* tres vel quatuor, ejusdem Coloris, Consistentiæ, Odoris *Urinosi*, & ex Ægræ relatione, multifaria cum nausea, Saporis; quæcunque clarius in Spagyrico Examine apparere. Tumet *Abdomen*; nec solum ut ante in Sinistro *Hypochondrio* durities, *Lapidumque* allidentium Sonitus, sed in tota *Ventris* Dextra Regione aliquando profundius ob Musculorum Laxitatem sentitur, magnumque Dolorem circa *Hypogastrium* queritur. Appetit Cibum Potumve modicè qui ex Radice *Glycyrrhizæ* Graminis & *Hordeo* usualis est, perque vices aliquid Vini Tenuioris conceditur. Dormiendo subsultat: Fluunt *Menses* rarius & parcius, nec tamen desistunt: *Pulsus* habet & Languidum, & Celerem, & Profundum, & Interceptum, pro variis Symptomatibus variantem: *Respiratio* Liberior, non Valida sed Sensu vix perceptibilis: Menteque plus nunquam movetur. Tandem 12 Dec. An. 1685, Tibia dextra Gangræna ad Palmæ latitudinem correpta Scarificatione cæterisque necessariis curata; nunc Angina notha, ob Tonsillarum Inflammationem premitur: plurimumque Arteriosi Sanguinis è Faucibus fluit, majoris forsan excernendi *Lapidis* Prodromus: Revulsionem per Phlebotomiam in Pedè & Clysmata tentatam secuta fuit 20 Febr. Dejectio Fæcum Naturalium per inferiora; 23. vero & Dejectio fæculenta & rejectio per Fauces oleosæ Clysmatis Substantiæ, cum Fœtore absque *Lapillis*; unde imminens Suffocationis metus abstinere jussit.

Hic Casus Rarus & Mirus varia Ingenia suscitavit. *Calculos* in Humano Corpore, ad Macrocosmi Leges, ex Principiis Activis, Vinculo Salino, cum Matrice Terra & Phlegmate, diversimode concreescere docet Analysis; Inque Glandulosis Partibus Corporisque Ductibus generari nihil ignoti, quod gravissimi Authores testantur, nostraque Observatione constat, præter Renum *Vesicæque* *Calculos*, An. Seculi 1677. *Catarinam* *Scertenleib* Puellam, Excretis tussiendo plurimis *Lapillis* *Tophaceis*, in Nosocomio nostro Phthisi occubuisse; è contra Sabulo multaque Pituita Gypseæ in Intestinis concreta varie dejecta, *Catarinam* *Blaseram*, An. 1680. in eodem Hospitio integre restitutam esse. Virum Amp. D. Jo. W. majoris Senatorii Ordinis, Arthriticum Mense

Julio An. 1683, utroque *Uretere Calculis* obstrueto, ab impedita *Mictione*, 17 *Morbi die*, non juvantibus variis *Seri Vacuationibus*, *Phlebotomiis* & *Lythontripticis*, *Apoplexia* obiisse; quos *Lapides*, alterius longe à nostræ *Ægrotæ* substantia, nulloque *Acido Spiritu* ob oleosam *Imprægnationem* solubiles, extraxi; *Ren Sinister* naturali duplo, *Dexter* vero triplo major, dilatatis *Tunicis*, multo *Sero* tumidi scatebant, plurimis obhærentibus *Lapillis Ruffis*, *Asperis*, cum ex *Ureteribus* secti essent *Apice* rotundo, forsan *Lavigato* in *Ductu*, & forma *Glandis Quercus minoris*: Nuperque è tonsillis *Puellæ Mariæ Hassneriæ* ad 32 *Tophos* secuit *Civitatis* hujus *Chirurgus* expertissimus *D. Albertus Baurenkoningius*: Insuper à *Clarissimo Dn. Doctore Sclareo* *Historia* communicata de *Calculis Felleis* raræ magnitudinis pro angustia ductus *Cholidochi* & alia *Filii Ebrai* cujusdam, 11 *Annorum*, *Weinheimii* in *Palatinatu* degentis, *Lapillos* diversi generis, immo *Silices*, per *Virgam Anumque* excernentis, ab *Urbis Heidelbergæ* *Secretario Cl. D. Zweifelio* mihi perscripta.

Verum cum similia visu, reipsa plurimum dissimilia sint; *Physico Examine* *Calculos* hosce subjecimus,

1. *Solvendo*: Sic *Spiritus Sulphuris*, *Vitrioli*, *Acetique* affusus, aliquem *Effervescendi* motum incipit, imprimis in iis qui *Ventriculo* excreti rarioris *Texturæ* friabiliorisque substantiæ sunt; sed citius, *Acidis* suis particulis inflexos *Poros* ingressis, subsistit, nullamque *Solutionem* perficit. *Salis Armoniaci* *Spiritus* ne quicquam movet, & omni modo tentatus, veluti *homogeneus* *subjecto* suo, conquiescit. Sed *Nitrosus Achilles* cuncta destruendo subegit.

2. *Distillando*, per *Retortam*: *Oesephago* excreti *Salis Volatilis* cum *Spiritu* & *Phlegmate* paucum, *Terræ* plurimum, *Salisque Fixi* fere nihil; *Posteriores Alvo* redditi, cum iis ex *Vesica* ejusdem *Figuræ* & *Substantiæ*, plus *Volatilis*, cum paucis ad *Gustum* subacido *Phlegmate*, sed *Spiritu Urinoso* forti, modicum *Fixi Salis* ac plurimum *Terræ* habebant. *Calculorum* horum *Unciæ* sex exhibuerunt *Capitis Mortui Uncias* 5. cum *Drachmis* duabus, & ex his *Salis Lixiviosi* vix *Scrupulum* cum dimidio, *Phlegmatis* cum *Spiritu* & immisto *Sale Volatili* *Drachmas* 5. & semis, adhærente quadam portione *Recipientis* *Lateribus*: Hic *Liquor* junctim sumptus, addito *Spiritus Vini Alkalisati* quanto, in *Alembico* exiguo *Caloris* gradu sublimatus, deposuit in *Capite* *Salis Volatilis Urinosi* *Scrupulos* duos & semis. *Olei* nihil conceptum nisi *Volatilium fluorem* *Salium* eo referre velimus.

3. *Præcipitando*: *Liquor Distillatus* *Spiritus Vitrioli* additamento in *rubram Tincturam* vertitur, tandemque crassior evadens quodammodo secedit in *Fundum*; *Affusus* vero idem *Spiritus* à *Distillatione* residuo *Capiti Mortuo* aut *Sali* inde *Elixiviato*, non aliam quam cum *Sale* & *Oleo Tartari* impetuosam *effervescentiam* excitat.

Sic *Lapides* nostri constant plurima *Terra*, *Sale Vol.* exiguo, *Acido* perpaucis, quod *Sale* *Spirituque Urinoso* *Infrastructum* & *Edulcoratum* esse, *Spiritus Armoniaci* ejusdem *Naturæ* demonstrat, *Acidorum* partibus immixtus eas *Retundendo* & *Implicando* in *dulcem Saporem* cogit, post non resolubiles.

Exin concludimus *Salium Lixiviosorum Naturam* à *Salis Tartari* non rece-

recedere in *Ægra* nostra; & reperta Matrice, incorporandi subjecto accedente *Acido*, motum (effervescentia aliqua prægressa) invicem sisti, inque *Calculos* hosce coire; prout *Vitrioli Spiritus* Particulis suis acutissimis & flexibilibus (unde *Oleosus* tangitur) *Sal Tartari* penetrando quidem destruit, sed destructam in sui Naturam aliter colligando cogit: In hisce *Calculis*, ut jam ad suam Crasin dispositis, nil præstitit; verum *Sal Fixum*, Igne sublatis implicandi Spiritibus, in suam Naturam reduxit, ex qua Coagulum constat. E contra, *Nitri Spiritus*, *Acidus* quidem, sed ob subtilissimi Salis Conjunctionem particulis Rigidioribus, Penetrantissimis, Inseparabilibus constans, non tantum una Qualitate cuncta solvebat, sed & altera Reunionem impediebat; cum particulæ hujus Rigidiores, in actu continuæ, sese flectere, Saliaque divisa in alieneam Naturam combinare non valuerint.

Spiritus vero Salis Armonaci Urinosus, Salibus istis Volatilibus consimilis, ex fixis productus, illam non modo Quietam reliquit, sed & hæc ut Gremium suum amplexus.

Hinc longè alia *Calculorum* horum generandi ratio & locus quam eorum qui abs *Renibus* excluduntur, cum hi è particulis Seri Rigidioribus, vel ad Pororum *Renalium* relationem Crassioribus, sensim obhærentibus eosque oblitterantibus contextentur; Lubrica quidem Aqua Flexibilibus particulis decidat, Salia vero Sero innatantia Volatilia insensibiliter Reticulo huic implicantur, tandemque in *Lapideam* duritiem accrescant, quod prius communi Experientia constans exhibet Senes, quibus Crassiores Humores, minusque meabiles Meatus contingunt, in hunc Affectum valde pronos; Posterius *Distillatione* firmatur, etenim imminuendo ejusmodi *Calculos* donec Collum angustum *Retortæ* ingrediantur, prodit Spiritus Urinosus cum Sale Volatili multo & aliquo Oleo, remanentque in Fundo *Retortæ* non commotæ *Figuræ Lapidum*, quæ in Cineres commovendo decidunt, quæque rursus affuso Distillato Liquore in *Calculos* conjunguntur: ex quibus Salis Volatilis copia & implicandi modus in his optime constant.

Qualiter vero & ubi in *Ægra* nostra generentur *Lapilli* & *Tophi Tartarei*, (ea in Vivis) vix esset hujus loci & temporis divinare, nisi rationi aliquid concedendum foret.

Vescas sub *Epidermide*, limpidi Sero flagrant, ibique ob im peditam *Cuticulæ* transpirationem Obstructosque Glandularum subcutanearum Poros denegantes refluxum collecto, Sanguini Pellenti non vero Quieto ortum debent; cum hic à tempore quo coagulari visus est, nusquam Ampullas fuscitavit, & secus motui contrarium esset: Mordax vero lancinansque Humoris qualitas atque inspissatio singularis, *Acidi* in Corpore prædominantis argumentum; cujus rimari naturam difficile, cum levissima additione vel detractiōe Motuve Humores alterentur, ut ex *Chylo Sanguis*, ex Sero *Lympha*, ex *Aqua-Forti Regia*, generentur, aliisve Naturalibus cernere evidens est. Qui Humores in receptaculis suis Glandulosis, ut locis Natalitiis, variis & perversim alterati tantas Coagulationes efficient, cum stagnantes exhalato *Alkali Spirituoso* inspissantur & accescunt; haud secus ac Analogum Sanguini, *Vinum*, quod evanidis *Sulphuris* particulis quibusdam Acidæ incorporatæ hærebant, relictis his, in Acorem vertitur: Et certe Dulcis Acidique ratio non

non alia est, quam diversimoda major minorve Acutarum partium cum aliis commixtio, actusque retardatio, ut in *Saccharo Melle, &c.* Hinc Sanguis, etsi tandem Inspissatus, tamen Dulcis Linguae occurrit: immo pro Tacitus ratione magis minusve feriunt, parva inter Titillationem & Dolorem distantia. Merito ergo *Glandula*, præprimis Inferioris *Ventris*, Seri *Lymphatici* vel Pituitæ in hoc *Acidæ* Receptacula & Ergastula, in vitio occurrunt, quo Humor, jam Heterogeneus Ductibus suis haud exoneratus, atque è *Pancreate* in *Duodenum* longo Intervallo non solutus, Acidior evasit: Hinc prior hisce præ *Utero* attribuenda Mali labes, (cum naturaliter absque Imprægnatione, *Mensium* suppressio ante Annos senectutis, nulla contingat) quæ in hoc Corpore primos effectus latentes ederit, unde restagnans Sanguis majorem Corruptionem, majoresque Turbas fovebat; non enim sub-ordinatæ Causæ pugnant.

Subita vero *Vesicarum Evanescentia* ad Remedia Resolventia Volatilia com- mode refertur, quibus Obstructiones universi referare nitebamur; factum unde ut una cum Meatibus Glandulosis patefactis non modo refluxus res- soluto Humori datus, sed & magnum Pituitæ receptaculum *Pancreas*, im- petu in *Intestina* & ab hinc Massam *Chyli* viscosam, indeque *Sanguinis* Uni- versam, Humorem contentum Acidum effuderit, sicque Diathesin parvam hucusque continuatam induxerit: Qui *Chylus* juxta Principia sua alius vix statui potest, *Egra* adhuc insanis magno Aquarum Potui ad juvenilem *Vi- scerum æstuantium* Calorem Supprimendum dedita; Aquis etsi in hac Urbe Saluberrimis in Subjecto capace evidentem Causam non detrahimus, ex qua consequens obstructio *Ductuum Glandularumve* concinnari potuit: Quantum vero, vel an contribuat *Bilis* in *Petrificatione* hac vix invenire est, cum hæc aliter ac nostri *Calculi* Sale Lixivioso redundet. Hinc *Ventriculus*, *Intestina*, *Glandula*, Primarii generationis loci, quamvis & in *Vesica* secundario pro- creentur: Latex quippe Urinosus primæ Digestionis vitio ita inquinatus, secundæ excrementum, multo Acido, Saleque & Crasso Phlegmate imbutus, in *Vesica* stagnans, in Coagulum invicem accedentibus particulis aptis coivit; unde & *Mucus* & *Calculi* absque alterius rei accessu vel dissipationis spe.

Quatenus vero ante, *Silices* exiguos variaque Camenta evomuerit, cum abhinc Vomitu nihil excreverit, Causa delitescit in Corpore; Aquarum ta- men pro ratione subjecti occupati diversa, diversa est *Lapides* producendi & incorporandi vis.

Pondus Specimina probant; non enim desistente Agendi vi in subjecto disposito Effectus continuantur, ut 10 hætenus *Libras* superarint. Alienz à *Podagricorum Tophis* Substantiæ primes *Ventriculo* excretos, rarioris com- pacturæ, Aer non ut Salia humectando cum minima haberent in Fluorem, sed rariores minusque firmiter implexos Angulos movendo insensibiliter contri- tos in pollinem redegit; quemadmodum in *Vitriolo Albo*, Lignis corruptis exsuccis, aliisque ab Aere contingere videmus; contra vero *Vini Spiritus Rectificatus* raros Poros facillime intrans, nec Aeris, instar vibrans, Fibrillas Quiescentia sustinebat.

Motus

Morus Naturam esse renitente Objecto circulare vermiculariter at retrograde in nostro Subjecto, patet, majoribus *Lapillis* ad angustam portam intra exitum *Illi* & principium *Coli* circa *Cacum* obhærentibus, retractis Orbicularibus musculosis *Intestinorum* Fibris, *Peristaltici* Motus Inversionem contigisse, causam vero tam violentam ut *Calculorum*, facile Valvulam aut ineptam everfisse, aut plane dirupisse. Hoc Ostio patente, quidni stimolata *Intestina* Clysmata sursum absque Excrementis durissimis rejecerint? Cum *Scybala* videamus in *Colicis* adeo indurata Cellulis inhære, tandemque ad *Alvum* descendere, ut vix Coctione solvi, multoque minus Clysmate dilui possint: Æque quidem mirum hæc contigisse & etiamnum contingere in fartis Ductibus crassioribus *Lapillis*, verum ad horum Figuræ Varietatem spectantes, eos non ad *Intestinorum* Cavitatem conformari, sed ubique lateraliter, immo in aliquibus per ipsa quibus perforantur Foramina, *Chylis* Descensum & Clysmatibus Ascensum concedere.

Urinosi Laticis Colorem varie immutari, Substantiamve alterari, pro accedentis vel deficientis ratione, quemvis Dies docet; *Cæruleæ* vero pellucidæ contra Naturæ Ordinem succedentis cum tempore alia est perquirenda ratio; illis enim magis minusve *Bile* saturatis intenditur vel remittitur, Tinctura, aut admixtis variis Heterogeneis, vel Spiritibus Exhalatis incrassatur, inque opacam & virulentam vertitur *Urina*.

Cujus collectæ excretionem impediēbat Mucus in *Vesica*, ejus Collum glutinans, tantam vero 8 *Librarum* quantitatem *Vesica* capere incapax, nisi non-naturalem Extensionem ei concedamus; qualem in Puella sub finem *An.* 1672, *Johanna Hufschleria* observavi; ad quam ut *Asciiticam* accersitus, querenti causas obtigit Inflammatio Colli *Vesica*, Anodyna & post *Catheterem* applicari jussi, unde incredibilis *Lotii* quantitas *Libras* 9. superans, subfidente *Ventre*, continuo fluxit, ipsaque convaluit; *Urinæ* vero non tam in *Vesica* quam *Renibus*, Vasisque cæteris redundare superius Exemplum *Dn. J.W.* declarat. Evenire unde potuit ut excedens hujus Laticis *Urinosi* Quantitas apertis *Cæliacæ* Ostiis in Cavitatem *Ventriculi* exudarit, verum proptus Observantibus constat, *Urina* non redundante ejusmodi fieri vacationem, plurimum Puram, aliquando vero quibusdam *Chyli* Ciborumque Particulis Mixtam; Nec si quis antecedentem Historiam serio examinabit, ne quicquam Excretiones ante primas *Ægræ* ingestum, multo minus hucusque datum intelliget, quod *Urinosum* Saporem inducere valuerit; nec Latex semper redundans Vasa Sanguifera eructare cogit: Inde ex ipsius rei contingentibus veris aliquid contra Naturæ Leges in hoc Corpore contingere conicere licet, forsāque continuatæ *Calculorum* generationis aliqua causa petenda, cum *Ventriculus* nova Saburra perversoque Fermento Humorum quotidie tentetur; secus jam jam Remediis alteratus esset: Memor quidem Exempli quod mihi contigit, *An.* 1677. in *Eva Zuberæ* Annorum 40, Cive Urbis hujus, quæ enixu Partus violento, *Vesica* *Urina* distenta, Fœtus exitu valide compressa, hæcque violenta causa aperto *Uracho*; *Urinæ* per *Umbilicum* integro Puerperio majorem portionem exoneravit; demum consolidato hoc, naturaliter fluxit. Ast à Naturalibus & Manifestis ad Non-naturalia Occulta hactenus concludendum non est.

Absti-

Abſtinentia thema *Lentulus* noſter ad Divum *Jacobum Primum*, Regem *Angliae* Potentiſſimum pertractavit, ignoto tum *Transpirationis* huiusque Principii *Circulationis* cauſa, varie Ratiocinatus; ſed ad hanc refleſcentes, hominem *Reſpirare*, adque Subſtantiae deperditae Reſtaurationem reſci, *Ars Statica* docet plus inſenſibiliter è corpore excerni *Transpirando*, quam per omnes excretorias Vias ſenſibiliter excludi. Ut Vir Robuſtus in Actione permanens, 8 *Librarum* Potu Ciboque ſingulis diebus ſaturatus, Tres tantum vel in ſummum 4 *Lib.* manifeſtis in Excrementis deponat, facta tamen *Digeſtione* amplius non ponderet quam Cibus ante ſumptum: Hinc *Coſtium* Energia omnia imminui, inque Spiritus tandem reſolvi, & *Transpirationis*, in ſolutione Morborum inſenſibili & *Heſticorum* devorata Subſtantia, veritas conſiſtit; qua non ob *Epidermidis* conſtipationem procedente, non opus erat *Reſeſtione*; ſecus Aer inſpirari ad Spirituum Vitalium Reſeſtione debuit, ut expirari poſſit, ſicque in Motu manere; qui ipſe Aer inſpiratus, In craſſatus, in Vaſis in *Serum* verſus, *Urinandi* materiam tempore *Abſtinentiae* commodam præbuit, ut *Hydropicos* ſæpius cernimus ſolo Aëre, aquoſis ſuis particulis, increſcere.

An Examen of
theſe Stones by;
Dr. Fred. Slare.
Jb. p. 103. n.
382. p. 140.

2. Two of theſe Stones being ſent to the *Royal Society* by Dr. Sig. Konig from *Bern*; in order to the better Enquiry into the Nature of this *Helvetian Concretion*, I made it my firſt Attempt to compare it with its *Relative Pondus* to *Water*; having ſatiſfied myſelf, that there is a *Standard of Gravity* ſo competent to all real Stones, that where they decline from this *Standard*, we have good Reason to queſtion thoſe Concretions whether they are Stones or no. The *Standard of Gravity* for real Stones, I find to be generally about 2 to 1 of *Water*, and a little more. This Concretion was very hard and ſeemingly heavy, but it was really very ſpongy; for when it lay under *Water*, there paſſ'd a good while before I could clear it of the lurking Bubbles, ſo that it grew heavier from time to time as the Bubbles were expell'd, and at laſt arriv'd near the *Standard* of a true *Stony Concretion*, or rather ſomewhat beyond it. It weighed in the Air 12 Dr. 36 Gr. in *Water* 6 Dr. 48 Gr. the Difference 5 Dr. 48 Gr. therefore the Proportion betwixt this Concrete and *Water* proves to be as 217 to 100. This extraordinary *Pondus* gives Reason to ſuſpect that there may be ſome Metallick Ingredient in it.

Whiſt I was making theſe Tryals, I was willing to compare this Matter with common *Chalk*, which I found *Specifically* lighter, bearing only the Proportion to *Water* of 180 to 100. Wherefore this Subſtance being ſo much heavier than *Chalk*, can ſcarce be thought a Concretion of ſuch a Matter.

I then compared it with *Petrified Water*, being an Icicle that was broken off a *Grotto*, where a Petrifying Spring did furniſh enough. A Piece of which, of 5 Dr. diſcover'd its Weight to bear the Proportion of 219 to 100 to that of *Water*. Our Anomalous Subſtance being ſo near the Weight of *Petrified Water*, would almoſt incline a Man to believe it a real Stone, and the rather, becauſe we are inform'd the Patient drank much *Water*. Moreover, the following Experiments upon this Matter,

do

do seem to give Proof of its being rather of the ordinary Stony Constitution, than of that which is proper to *Animal Concretions*. For Instance, we first of all pour'd upon it ordinary *Vinegar*, and it presently wrought upon it with a hissing Noise, as it did on the *Petrified Water* when powder'd. We pour'd on it *Spirit of Vitriol*, and that also wrought upon it and dissolv'd it, but let it fall again, as *Aqua-Fortis* does *Tin* when it has corroded it. *Spirit of Salt* wrought upon it very vigorously, and presently dissolv'd it, and kept it so without any *Precipitation*. These Experiments do also distinguish this Concrete (whatever it be) from the ordinary *Animal* ones, as the *Stone* in the *Bladder*, *Kidney*, the *Tophi*, &c. for these will not be dissolv'd, or in the least corroded by any of the mention'd *Acids*: Tho' *Spirit of Nitre* be a general *Menstruum*, that dissolves them all readily. And there are some things yet very strange, which make this Case peculiar: Namely, that those *Stones* which are generated in the Habit of the Body, I mean, in the very ferous Part of the Blood, and those that passed the *Bladder*, have just the same Nature with those that are *extra Habitum*, even those evacuated *ex Stomacho* and *ex Ano*; for one as well as the other will be presently corroded by so mild an *Acid* as plain *Vinegar*.

The Relator in his *Analysis* of these *Stones*, gives an Account of so great a Quantity of *Volatile* and *Fixt Salt* obtain'd by his *Distillation*, that those Trials do necessarily make it an *Animal Substance*; but that Experiment so far fail'd us, that I am not satisfy'd as to the Matter of Fact: For that those Concretions generated *extra Habitum*, in the *Stomach* and *Guts*, should abound with *Volatile Salt*, is strange; for I have try'd the *Bezoar Stone*, said to be generated in the *Stomachs* of some *Animals*, and could obtain no *Volatile Salts* from that Substance; though it herein agree with this Substance, that it is easily wrought on by many *Acids*.

We may in some measure question that Principle, or rather *Hypothesis* of *Acidum*, our Correspondent trusts to, for the Combination or Coagulation of the Humours in the Body, in order to this *Petrification*, it being suppos'd, not prov'd. We may also question whether the *Fixt* or *Alkalizate Salt*, found in the *Caput Mortuum* after *Distillation*, were really pre-existent in that Form in the Blood, or other Humours, and not rather a Product of the Fire.

3. We brought this *Stone* to a gross Powder, and convey'd it into a coated *Retort*, which coated *Retort* was kept for some Hours in a naked Fire, so hot that the Glass melted. The Quantity we put into the *Retort* amounted to $\frac{1}{2}$ an Ounce and 20 Grains. The Liquor that came over seems scarce to afford 3 or 4 Drops, which looks like *Spirit of Harts-Horn* rectified, and smells much like the same: Which plainly discovers it an *Animal Substance*, though it affords much less than the *Calculus Humanus* does; and by Consequence gives us a much larger Proportion of *Caput Mortuum*, or *Residuum*, in the *Retort*: All which is very consentaneous to the Nature of the *Stone*; for its *Specifick Gravity* was much heavier than the *Stones* are we usually find in the Humane Body; and therefore the Parts may be suppos'd more fixed, or to consist of fewer *Volatile Parts*, such as are

A farther Tryal,
by Dr. Fred. Slare.
Ib. p. 145.

carry'd over by *Distillation*. We weigh'd the Remainder in the *Retort*, and it came to 3 Dr. and 50 Gr. 10 Gr. of which seem'd to hang about the Neck of the *Retort* in the Form of a dirty hard-bak'd Oil. The other 20 Gr. are partly gone off in Vapour through the *Lute*, and what we find in the *Receiver* in a liquid Form.

Ib. p. 143.

Ib. p. 145.

We try'd part of this *Caput Mortuum* by applying Mr. *Haak's* strong *Magnet*, to enquire whether it contain'd any *Iron* Particles, but did not find any would adhere. But since Dr. *Lifter* has found them in much lighter *Concretions* than those of the *Kidneys* are; and many Bodies, though not till after *Reverberation*, or a strong *Calcination*, have detected an *Iron* Contexture; and even the *Marchasite* itself, though very pregnant with *Iron*, shews it not, till it has been *calcin'd*: There remains yet one Trial to be made, and that is to give it a much stronger *Reverberation* in the Fire, and then to see whether some Particles will not prove *Martial*.

The Production
of Stones in Ani-
mals, by Dr.
Fred. Slaro. n.
157. p. 523.

XCI. 1. It is generally observ'd by those that have been subject to the Stone of the Bladder, that Pains in the *Kidneys* were antecedent, which intimates the Foundation was first laid there, and afterwards by the *Ureters* and a Gush of *Urine* convey'd into the *Bladder*. The Manner of its Growth in the *Bladder* is obvious; the *Urine* (by some call'd *Lotium*) being too highly satiated or impregnated with a ponderous Matter, (which we here design to examine) precipitates the same at certain Times upon the mention'd Basis, and also on the inward Superficies or Coat of the *Bladder*, which upon a Relaxation of their distended *Fibrae*, do so strictly embrace that preternatural Substance it finds there, as to overlay it or cloathe it with whatever Sediment subsided there.

That the *Urine* only at some Intervals is dispos'd to let fall this Matter, seems probable from this Observation, That the *Concrete* consists of several Spherical Superficies, or round *Incrustations*, which like so many distinct Shells may be parted from each other. Moreover, these *Incrustations* are observ'd to be very unequal, some much thicker than the other: An Argument that the *Urine* continu'd much longer dispos'd to depose this *Calculous* Matter at one time than at another; or else that it was much more satiated, or abounded with this ponderous *Precipitate* at one time than at another, and so laid it over with a thicker *Crust* in as short a time.

If we examine the Causes that have been assign'd to the Production of this *Concrete*, I think we cannot well grant Heat in the *Kidneys* to be a probable *Efficient* Cause; a much more Intense Heat than is possible to be found here being necessary to make Bricks, or bake Sand and Earth into Stone. Nor is it necessary to derive the *Material* Cause from such a Slimy and Ropy, or *Mucilaginous Indisposition* of the *Humours*, that may perhaps coagulate and harden into a Stone: Such a *Viscous Urine* being less apt to precipitate this gritty Matter, than more thin and limpid *Urine*. For I have found in more than one, where the *Urine* has often been so ropy and stringy, that it would draw out into Threads upon the Application of a Stick; but yet we never discover'd Symptoms of the Stone in the *Kidneys*.

neys or *Bladder* of such Persons. Nor do I believe that an *Acid* meeting with some *Alkalies* may be reasonably concluded to constitute this so firm and solid a *Concrete*, since nothing that I know of but *Acids* will make the least *Solution*. We may also except against the Experiment of *Coagulation*, upon the Mixtures of highly Rectify'd *Spirit of Urine* and *Wine*, which if warily managed, will make a *Coagulum* with such Expedition as seems very strange and surprizing; for this *Concretion* will easily be dissolv'd by Water. In like manner, if either of the *Spirits* be very *Phlegmatick*, there will follow no *Coagulation*; insomuch that the Humours of the *Humane Body* contain too much Water in them to admitt such an Effect, even in those Constitutions that have used themselves to very highly Rectify'd *Spirits*. Moreover *Horses*, *Dogs*, and other *Animals*, that drink no *Wine*, are not free from this gritty *Cementation*. Nor could I ever discover any Drop of *Vinous Spirits* afforded upon our *Distillation* of this Matter. We may also question the *Hypothesis* of the Production of the *Stone* by *Petrification*. Stones are such fixt Bodies, that they yield nothing upon *Distillation*, except a small Quantity of insipid Water chance to rise; nor will they exhale very much in an open Fire; whereas we can *Volatilize* fix Parts of eight of our *Calculus Matter*, and obtain *Salts* and *Oils*.

The *Chymists* describe the *Concretions* of the Body, and particularly this Morbid one, by calling them *Tartareous*; who conclude they have sufficiently accounted for the Nature of a Body, if they can but call it *Tartar*, which must be acknowledg'd to consist of *Acid*, and *Fixt Salts*, call'd *Alkalizate*, and of some *Terra damnata*; tho' it be very little in Proportion to the other *Salts*. But there is little reason to eclipse its Nature by that Denomination, as appears by these following *Analyses*. We distill'd an Ounce of *Calculus Humanus*, that was recently cut out of a Body, which afforded about 2 Dr. of a brown *Spirit*, nearer to that of *Harts-Horn* than *Urine*. We put the *Caput Mortuum* upon the *Cuppel*, and reduced it to near a *Dram*; the rest burning and smoaking away. Another time, we distill'd in a naked Fire a *Stone* that weigh'd 2 Ounces; the Vapour came over upon a good stress of Fire, and settled in the Form of *Salt* without any Liquor, of which we preserv'd only a *Dram*; it appear'd very brown, and tasted bitter, as the *Fætid Oil* of *Harts-Horn* and other *Empyreumatical Oils* do. We examin'd by *Boiling* and *Evaporating* Water from the *Caput Mortuum*, whether it held any *Fixt Salt*, but found none. The *Caput Mortuum* weigh'd 1 Ounce and 6 Dr. so that it lost only 2 Dr. in the *Distillation*, that is, only 2 Dr. came over the *Helm*. We proceeded farther, and placed this *Caput Mortuum* upon a *Test* in an open Fire, where it burnt away to 2 Dr. 44 Gr. This we also boiled in Water to see what *Salt* it held; but it scarce afforded a Taste of *Salt*, scarce surmounting that we usually find in the like Quantity of common Water. In this *Fiery Tryal*, an Ounce and 3 Dr. of the 2 Ounces evaporated in the open Fire, (a material Circumstance which *Chymists* rarely enquire after) of which we have no Account. I endeavour'd to save some of it, by placing a Taper Chimney or Tunnel to receive the Smoak, as the Fire and a Pair of Bellows rais'd it, which so far succeeded, that I catch'd above 2 Dr. of this Fuliginous Substance, and some Drops of a Water of a *Fætid Saline Taste*.

The Smoak of our common Fires gives us a *Sublimate*, whose *Chymical Principles* are no less considerable than the Bodies from whence they ascend : For I lately found them not only to contain *Volatile Salts*, *Oils*, and *Phlegm*, with other things, but even a *Salt* so near to common *Sea Salt*, that it shot into Cubic Figures, much like to that we have obtain'd in an *Analysis* of *Humane Urine*. But because it may be objected, that that *Salt* might probably be nothing else but the common Culinary *Salt* we constantly take in with our Food, I distill'd the *Urine* of *Horses*, that were fed with Hay and Oats, and have obtain'd the same sort of *Salt*.

If we now compare this *Concrete* with *Tartar*, we find the one a *Vegetable Salt* wholly dissolvable in Water; the other so stubborn, that several very corrosive *Menstruums*, that will easily dissolve Iron and Copper, and Silver, and almost any thing, will not make any Impression here. The one affords a little *Volatile Salt*, which is *Alcalizate*, and no *Fixt Salt*; the one affords much more Earthy Substance, call'd *Terra damnata*, than the Hoofs or Horns of Animals, &c. and the other leaves us scarce any: One abounds with an *Acid Salt*, which is sensible to the Palate, and very manifest in the *Spirit* of *Tartar*; but in the other, we could discover none upon the narrowest Search.

The Notion of presuming this *Calculous Matter Tartareous*, has put Men upon using Medicines to destroy *Tartareous* Concretions, as well as avoid many things that seem to have *Tartar* in them, and yet at the same time perhaps it may be as inoffensive as some of those Medicines that are substituted; at least, as *Spirit* of *Salt* or *Common Salt*, commended by *Helmont*. In like manner, the Notion of *Petrification* (which seems from whence the *Stone* derives its Name) may be no less erroneous; there being no Agreement or Analogy in their Natures, whether we consider them *Synthetically* or *Analytically*. If we consider *Stones* in *Composito*, there is a particular Weight or Gravity belonging to their Bulk, in which they *specifically* agree. Several sorts I have weigh'd according to the *Hydrostatical Laws*, and I find them agree in being twice as heavy as their Bulk of Water, and about a 4th Part more. This I found true in *Wood*, *Bone*, and *Shells*, when petrify'd; and even Water itself, and some other Bodies, tho' never so light in their former State, as soon as they have obtain'd the Form of Stone, they all become of the mention'd Weight, or very near it. But this, which is call'd the *Stone* of the *Bladder*, is much lighter, and several of them agree in being only as heavy as their Bulk of Water, and a 4th Part more. This yields to none but the most potent *Acids*, and particularly to *Nitrous* ones alone; the other is dissolved by almost any slight *Corrosive*. The one in our *Analysis* affords various constituent Parts; and the other, upon *Distillation*, only a Drop or two of insipid Water, the rest remaining fixt.

But this *Concrete* may perhaps owe its *Origine* to a very soft and thin Fluid; more remotely, to the *Chyle*, strain'd through the *Guts*; and yet nearer the Matter, to the *Blood* itself; but nearest and immediately, to the *Serum* of the *Blood*, which seems to be its proper *Vehicle*. And we shall be less surprized to derive such

such firm and solid Productions from Fluids, when we consider that there are Particles floating in the *Blood*, always disposed to be converted into *Gristles*, or to make up the solid *Skull*, *Nails*, *Bones*, &c. and that even the *Teeth*, whose Texture is very firm, are made and supply'd out of the soft Fluids of the Body. Even some of these solid Parts of the Body may, by a *Disease* of the *Blood*, be abraded, and absorbed by the common Fluid, and precipitated by their own Weight upon the *Pelvis*, or else stick in the *Tubules* of the *Kidneys*, and so choak them up, and by degrees extend them to Rupture, or grind them to Pieces by a constant Impulse of this gritty Substance, which may at last convert the greatest Part of the *Kidneys* into this firm *Concrete*. Moreover, without any respect had to these solid Abrasions, the *Blood* itself (of which the *Serum* is a great Part, and with which it is intimately mixt) consists of heterogeneous Particles, of so various Forms, Sizes and Shapes, which seems necessary for their accommodating themselves to all Parts, that even these, design'd to constitute the solid Parts, may suffer such irregular Changes in the Body, which may unfit them to pass the *Emulgent Vein*, and so to continue their *Circulation*: Insomuch that the continued *Impulse* of this Matter by the *Artery*, may make very considerable Aggregates or *Concretions* in the *Kidneys*. And not only so, but without either respect to *Vein* or *Artery*, the *Serous* or Watry Part of the *Blood*, which we said before was the *Vehicle* of the *Stone*, may have inbibed such heterogeneous, gross and ponderous Particles, as may, whilst in Motion and Agitation through the *Veins* and *Arteries*, fluctuate and mix well enough together, but may very easily separate upon the least *Stagnation*. Thus the various Mixtures in a *Torrent* seem to make up one Homogeneous Fluid; but if some Part of this Fluid happen to fall into a Pit, or *stagnate* in a quiet Place, we shall find it clear itself of *Sand*, *Mud*, and other differing Parts.

That the *Nature* of this *Concrete* seems rather referible to *Bone*, than to any other consistent or fluid Part of the Body, I concluded by comparing their *Chymical* Products. Having clear'd the *Bone* of *Marrow* and *Fat*, by boiling it in Water, I *distill'd* it, and obtain'd about 2 *Drams* and a half from an *Ounce* of *Bone*, of a *Volatile Liquor* impregnated with *Salt*, that smelt very much like that I have mention'd; which was very differing from *Spirit of Urine*, and nearer that of *Harts-Horn*. I found the *Caput Mortuum*, as to Weight, very consonant; and also could extract no manner of *Salt* from it: For which Reason *Refiners* make their *Cuppels* of *Calcin'd Bones*, they being forc'd to *dulcify* (which they call washing out the *Salts* of) other *Ashes*, before they can make *Cuppels* of them. Last of all, it herein also agrees with the *Calculus Humanus*, vulgarly so term'd, that few *Acids* will dissolve it, excepting those that are *Nitrous*; nor do these work on it very vigorously. But herein they must be allow'd to differ in their *Specifick Gravity*; the *Calculus* not having so close and compact a Texture as the *Bones* have. For *Bones* I have found twice as heavy as their Bulk of Water.

Several *Stones* of the *Bladder* and *Kidneys* were *distill'd*, and all afforded *Volatile Urinous Salts*, which ferment upon any *Acids*; *Bones* were *distill'd*,

Several Comparative Experiments made upon *Stones*, and other things. Ib. and p. 532.

and found to be of agreeable Principles; *Petrified Water* affords only fresh and clear Water upon *Distillation*.

Calculi examin'd *hydrostatically*, were found in Proportion to their Bulk of Water as 5 to 4; *Flint*, *Crystal*, *Petrified Water*, *Welch Diamonds*, *Petrified Wood*, almost as heavy again as our *Calculous Matter*, and *Bones* twice as heavy as Water.

Bones were not easily wrought on by common *Acids*, only by *Nitrous* ones, and that without *Ebullition*: And various unsuccessful Attempts were made to dissolve the *Calculus* by *Acid* and *Acrimonious Menstruums*, whereof some were *Vegetable*, and some *Mineral*; as *Spirit of Salt*, of *Vinegar*, of *Venus*, *Oil of Vitriol*, &c. also with *Alcalizate Acria*, as *Sal Fraxini*, (which corrodes *Glass*) *Lapis Infernalis*; but none would touch it, except *Nitrous*.

The Generation of the Stone, by Dr. Thomas Molineux. n. 302. p. 818.

2. The different *Texture* of Parts in one and the same *Stone*, observable in most of this Kind if they be of large Size, proceeds, I am apt to think, from the same constant Bed or settled *Posture* of the *Stone* in the *Bladder*, whereby some Parts of it are more expos'd to imbibe the Moisture of the *Urine* as it falls or settles in the *Bladder*, than others; and by this sort of *Maceration* are kept soft; whilst those Parts that lie higher, towards the upper Region of the *Bladder*, remain dry, harden, and gather a sort of gritty *Crust*; as we find most soft *Stones* do, that are dug out of the moist Earth, when expos'd a while to the dry Air.

It seems to me very probable, that *Stones*, when they come to be of a large Size, keep much one and the same *Posture* in the *Bladder* at all times, there not being room in so pliant and membranous a Body, that always contracts itself to the least Dimensions it can, to allow a *Stone* of any considerable Bulk, (for the Case is different in those that are small) to tumble or change its *Situation* very much.

But however this Conjecture may prove true or false, 'tis undeniable, that some *Stones*, from their Way of Generation, must of Necessity remain fixt and immovable in the *Bladder*, being closely joined and united to the very Substance of its Membrane: Of which Sort there are several Examples recorded by *Schenkius*, and other Collectors of Observations. And I am persuaded that that *Stone*, which I described above, may be reckon'd amongst them: For about the larger End, where it is mark'd *d d d*, there still closely adheres several thin Films and *Carneous Filaments*, which manifestly shew it was formerly united by this Part to the Membranous Substance of the *Bladder*; and that lately by its own Weight, or some other Accident, it was torne away, and fell into the *Urethra*, through which 'twas voided; and hence it was that this Woman, as she herself told me, never suspected herself, till very lately, at all troubled with the *Stone*.

Vid. *supr. Sect.* LXVI.

Fig. 39.

Stones extracted from Women, without Cutting, by Dr. Tho. Molineux, n. 302. p. 307.

XCII. Amongst the two vast Collections of *Stones*, that amount at least to several Thousands, kept together in the Hospitals at *Paris*, *L'Hôtel Dieu*, and *La Charité*, not one in a Hundred is taken out of a *Woman*. This must certainly proceed from the *Urinary Passage* in this Sex being shorter, larger, and more apt to dilate, than that in Men; so that for the most part, when Gravel,

Gravel, or a sort of viscous Clay Matter, which I take to be the chief Cause of the *Generation* of the *Stone*, falls into the *Bladder*, 'tis suddenly and easily discharged, e're it can cohere together, and form a *Stone* of any large Bulk: Which cannot so frequently happen in Men, by reason of the *Narrowness*, *Crookedness*, and *Length* of the *Passage* of the *Urethra*.

However, it sometimes comes to pass, that even in *Women*, either from a more depending or less elevated Posture than usual in their *Bladder*, or that the Matter forming the *Stone* adheres to some Part of its Membranes, so that it cannot fall into the *Urinary Passage*, till its own Bigness or Gravity forceth it thither; *Stones* of a very considerable Bulk are generated. But the many Instances we meet with of vast *Stones* spontaneously voided, are so many Arguments from whence, I think, one may reasonably infer, That no *Woman* need to be obliged ever to undergo the painful and hazardous *Section* of the *Stone*. For since Nature by her own Power, without the Assistance of any Help or Remedies, can disburden herself, and force away such large *Stones* as those described by several Authors, we may probably conclude, that even those still larger (if there be any such bred in *Women*) may be brought away by putting the Body into a convenient Posture, and so by the Hand and Fingers forcing the *Stone* into the *Urinary Passage*; which by Application of Relaxing, and strongly Emollient Remedies, may be so dilated, as to give a free Passage to the *Stone*, without any forcible *Section*.

Ib. p. 810.

Vid. sup.

The Practicableness of this Method hath been successfully demonstrated by Mr. *Tho. Proby*, an ingenious *Chirurgion* of *Dublin*, in three Instances of Fact.

Ib. p. 827.

1. The first Instance was *Sarah Cook*, a Child about 6 Years old, who for some Years had been so miserably afflicted with the *Stone*, and a perpetual *Incontinency* of her *Urine*, that her Parents, at any Hazard, were willing to attempt relieving her of so violent a Pain, and so foul a Distemper. Whereupon, *June 8. 1693*, the Child being placed in a convenient Posture in a Man's Lap sitting across a Table, with her Arms tied down to her Legs by a sort of Bandage, usual in these Cases, the *Chirurgion* first pass'd his *Catheter* into the Neck of the *Bladder*, that it might empty itself of all *Urine*, before he inserted his *Dilatory Instrument*, or his *Speculum Vesicae*, as one may call it, with which he extended the *Urethra* as much as possibly he might with Safety, and without putting the Child to extraordinary Pain: Afterwards, by Help of a *Director* and *Forceps*, gently thrust into the *Bladder*, he brought away the *Stones*, without any manner of Incision, in about 3 or 4 Minutes time from the passing in of his first Instrument, and put the Patient to so little Pain during the Operation, that when it was over, and she laid quietly a-bed, she slept without any *Opiate* 7 or 8 Hours together, as she had not done many Months before; and was in a short time perfectly well and at Ease.

Fig. 44.

2. The second Instance was *Eliz. Mortimer*, about 10 Years of Age, who had been troubled with an *Involuntary Distilling* of her *Urine*, and other painful Symptoms of the *Stone*, for these 3 or 4 Years past; but on *June 12. 1693*, she was happily relieved by the *Extraction* of a large *Stone*,

Fig. 45.

near

near as big as a Pigeon's Egg, after the same Manner and Method as before described, and with as good Success, though not altogether with as quick Expedition.

n. 236. p. 11.

3. I have been still more confirm'd in my Opinion of the Reasonableness of this Method, by several other successful *Operations* I have seen of the like kind; but more particularly, by one lately perform'd in *Dublin* on *Sarah Jones*, a Girl between 11 and 12 Years of Age, that for 6 Years had been severely afflicted with all the painful and usual Symptoms of the *Stone*. But Oct. 16. 1697, she was happily reliev'd, by only dilating gently the Neck of the *Bladder*, and then extracting a *Stone* of a very considerable Bulk, without making any *Incision* at all. The whole Operation was perform'd in 6 or 7 Minutes.

Fig. 46.

By the extraordinary large Size of this *Stone*, it may seem almost incredible, that a Solid of that Bulk should be forced through the *Urethra* of so small and so young a Child, without any manner of *Section*; and that the Child should recover so as to be perfectly well, without the least ill Accident succeeding the *Operation*. But we may gather hence, of what vast Extension this *Urinary Passage*, though naturally strait, is capable; and how much still wider it may be dilated where 'tis proportionably larger, I mean of those of this Sex of riper Years, or grown up to *Woman's Estate*; who may yet more easily and safely be relieved after this Manner, even of *Stones* of a much larger Size than this we here speak of.

The *French*, a Nation certainly very subject to the *Stone* in the *Bladder*, and whose *Chirurgeons* therefore must of necessity be very conversant with this Disease, and expert in the *Operations* requisite for the Cure of it, have, I see, lately established this sort of Practice; tho' I must needs own I did not know so much, till I had perused a very useful Book of Chirurgery, published but this last Year 1696 at *Paris*, in 8vo, by *M. de la Vauguion*; entituled, *Traité complet des Operations de Chirurgie*. And I cannot but recommend it to the skilful *Chirurgeon* as an *Operation* fit for general Use in these Cases, being both safe and easily practicable, and also of great Benefit and Relief to no less than the Moiety of Mankind, whenever they are afflicted with this painful Disease. And to say truly, if *Women* in this Case would but timely seek for Help, before the *Stone* be too much grown, they might with far less Danger and Pain be relieved of this torturing and lasting Evil, than they are delivered of a common *Natural Birth*. But if at any time a *Stone* be found of so large a Bulk as not to admitt this sort of *Operation*, then the *Section*, if the *Chirurgeon* be so bold as to venture on it, must be made so wide, as wholly to cut through the short Neck of the *Bladder*, and to divide likewise some Part of its thin membranous Substance, which is known to be of the most dangerous Consequence in cutting the *Stone*, and to be avoided as certain Death to the Patient; according to that Aphorism of *Hippocrates*, *Cui secta est Vesica, lethale est*. However, I have Reason to think the Instances of this kind will be very rarely met with: For Experience justifies what I have observ'd above, that *Women* are not capable by Nature of breeding *Stones* in their *Bladders* of so big a Size

n. 202. p. 823.

n. 236. p. 15.

Size as Men frequently do; which is most apparent from those many Histories of stupendous large *Stones* registred by Authors, amongst which the Largest I have heard of, bred in a *Woman's Bladder*, was not $\frac{1}{2}$ Part of what has been produced of this kind in a *Man's*.

XCIII. Nov. 8. 1693. A large *Stone* was taken from Mrs. *Henchman*, a *Widow Gentlewoman*, of the Age of about 51 Years. Its Shape is not very unlike to a sort of Spring-Purse, (as they are call'd) which many People use; and its Surface is indifferently smooth, excepting only that there are 4 Protuberances, each of which is about the Size of a Hazle-nut; these seem to have been at first lesser *Stones*, which falling into the *Bladder* after that the great *Stone* was almost grown to its full Bigness, were there join'd to it, first by Adhesion, and at last became all one Body with it. It is also very probable, that the lesser End of the great *Stone* was once a distinct *Stone*, and fell into, or was separately form'd in the *Bladder* a good while after that the bigger Part had taken Possession there. The Length of the *Stone* is $3\frac{1}{2}$ Inches. Its Breadth, where largest, is very near $3\frac{1}{2}$ Inches. Its Thickness 1 $\frac{1}{2}$ Inches. Its Weight is 9 Ounces and a half *Averdupois*.

A large Stone
Cut from a Woman;
by Mr. Basil Wood, n. 209.
p. 103.

Dr. *Molineux* (that Learned Physician of *Dublin*) has mention'd two or three Notions, which I suppose this *Operation* does confute.

1. He thinks that *Women* never breed *Stones* so large as *Men*; the contrary of which seems to be manifest by this *Operation*: For perhaps a *Stone* of so large a Size as this, was never yet taken out of the *Bladder* of a living Man.

Vid. S. B.
LXVI. and
XCII.

2. He seems to conclude it probable that all *Women* may be freed from the *Stone* by Dilatation of the *Urinary Passage*, and then forcing away the *Stone* through it: Which Method I think cannot be depended upon, since the *Stones* may prove of so great a Size.

3. He says, that dividing the membranous Substance of the *Bladder*, is to be avoided as certain Death to the Patient; whereas this *Stone*, and many others, have prov'd too large to be extracted through an Incision made only within the short Neck of a *Woman's Bladder*.

The Patient never had the least ill Symptom since her being Cut, and is now perfectly well.

XCIV. Brother *James*, an *Hermit* in *France*, in his Extraction of the *Stone* out of the *Bladder*, makes Use of a Steel Staff, much bigger and shorter than those which are commonly made use of; it is shorter from the Top to the Bending of it, and it bends more than ours: He hath but two, one for Men, and another for Children. His Conductor is sleeker and longer than ours; the Point whereof, which goes into the *Bladder*, being of the Figure of a Lozenge, is wide and open in its Extremity. His Forceps have longer Branches than ours; but the Holds of them are shorter and wider, with many large Teeth within. The *Eurethra*, with which he draweth the Sand or Gravel, which remain sometimes in the *Bladder* after the *Stone* is

A new Way of
Cutting for the
Stone, by a Hermit
in France;
by M. Bultiere.
n. 250. p. 100.

out, is shorter than ours. His *Knife* is much longer and slenderer than ours.

He causeth the Patient to lie flat upon his Back, either upon his Bed, or upon a Table whereupon is a soft Quilt, in such a manner, that the *Fundament* is 3 or 4 Fingers over the Table, some Servant supporting his Thighs and Legs. He useth no Ligature, but only causeth his Legs to be bent against the Thighs, but not the Thighs against the Belly, except the Left, which in this *Operation* he useth more or less, as he thinks fit. Then he introduceth the *Catheter* or *Staff* into the *Bladder*; which though bigger and shorter than ours, yet seemeth to run in easier: Very often he holdeth it himself with his Left Hand, pressing it close toward the *Fundament*, in order to dilate and extend the Membranes of the *Bladder*. Then he feeleth with the Fingers of his Right Hand, to find out the *Staff* through the Skin; so having felt it, he runneth his *Incision-Knife*, at the Bent of the Left Thigh, upon the Fat Protuberancy below the *Ischium* Bone, directly upward, by the *Rectum* to the *Bladder*, which he pierceth by its Neck, and sometimes a little above it. When he *cutteth*, the cutting Parts of his *Knife* are turned upward and downward. Having thus pierced the *Bladder*, which he knoweth when the *Urine* runneth out; then he turneth his *Knife*, and thrusteth it a little farther, in order to open the *Bladder* wide enough that his Finger may go in easily. Then he withdraweth his *Knife*, and enlargeth the Wound in the outward Parts, of the Length of 2 or 3 Inches: After which he thrusteth his Finger into the *Bladder*, in order to know more precisely the Bigness and Situation of the *Stone*, and make it loose; but chiefly to dilate the Overture of the *Bladder*, by tearing its Membranes. Then he introduceth his *Conductor* into the *Bladder*, along his Finger which is in it. When the *Conductor* is in the *Bladder*, he taketh the *Staff* out, and introduceth the *Forceps* by the *Conductor* into it, with which he gets hold of the *Stone*, and draweth it out. If he find any Difficulty either in getting hold of the *Stone*, or in drawing it out, he useth all the Ways commonly used, raising the Left Thigh more or less, putting his Finger into the *Fundament*, and sometimes into the *Bladder*, to loosen it in case there be any Adhesion with the Membranes. Having found out and remov'd the Cause of the Difficulty, he thrusteth the *Forceps* again into the *Bladder*, and gets hold of the *Stone* and pulls it out.

It is to be observ'd, that this second time, nor on any other, he useth no *Conductor*, the *Forceps* running in very easily. He never trusteth either his Finger or any Instrument into the *Bladder*, without steeping them in *Oil of Roses*. He never useth any *Dilatorium*, or *Camula*, or Tents, in the Wound, except sometimes small Dossils in the Lips of the outward Wound, to keep them open for a little while. He only applies a Pledget steep'd in *Oil of Roses* upon the Wound. He operateth this Way as dexterously as any of our best *Operators*. Very often he *cutteth* the Patient upon the *Gripe* almost in the same manner as was used formerly, except that he maketh

maketh the *Incision* in the same Place as for the former: This Way he liketh better than the other, and it seemeth to be more favour'd by him; and indeed it is surer, tho' the Pressing upon the *Belly*, which he doth, is a very bad Method.

He *Cutteth Women* also upon the *Staff*, and in the same Place as Men. He did perform this *Operation* in my Presence upon three; one whereof was but a Girl of 11 Years old; which maketh me believe, that he useth the same Way in all, though in them he did cut the internal Neck of the *Uterus*.

But in my Opinion, that Way (either in *Men* or *Women*) is not so sure as the Ancient, by reason that the Point of his *Knife* not being directed by the *Staff*, he is always in Danger of piercing all the Membranes of the *Bladder* through and through; and besides, the Place whereupon he maketh the *Incision* being full of considerable Vessels, one can hardly avoid the cutting some of them. We have observ'd in almost all that died in his Hands, that there was a great deal of *Blood* in the *Bladder*, and some in the Cavity of the *Abdomen*. He succeedeth better when the *Stone* is big and large, than when it is small; by reason that a big *Stone* not only extendeth the *Bladder*, but it stoppeth the Point of the *Knife*. He did refuse to cut one, in whose *Bladder* there was but a small *Stone*; which confirmeth me in the Opinion, that the Unsuccessfulness of his *Operations* proceedeth from the Point of his *Knife* not being stopt, neither by the *Staff* nor *Stone*: for when there is but a small *Stone*, the *Bladder* being empty, he must necessarily cut the whole *Bladder* throughly, and consequently cut some of its own Vessels, which causeth the *Hemorrhage*, which is the better avoided when the *Stone* is very large.

The Observations I have made about this Way of *Operation* are these: I took a Body, in the *Bladder* of which I put a *Stone*; the *Staff* being in the *Bladder*, I did press it downward, hard enough to be felt through the *Teguments*, and made the *Incision* upon it in the Bent of the Thigh, in order to know whether it would not be a surer Way by securing the Point of the *Knife*; by that Way I got my *Conductor* and *Forceps* into the *Bladder*, and drew the *Stone* very easily; but afterward, by the *Dissection* of the Body, I found that the Artery of the *Penis*, and the *Vesicula Seminales* were cut through and through; which cannot be avoided, because the *Artery* and *Vesicula* lie immediately under that Part of the *Bladder* which the *Staff* presseth upon.

I took another Body, and having in the *Bladder* a small *Stone*, I made the *Incision* much lower, and pierced the *Bladder* under the *Staff*, by which *Incision* I drew the *Stone*; then dissecting the Body, I found the *Bladder* cut through, and its *Arteries*, which can hardly be avoided; the *Bladder* being there so much contracted, that both sides of the *Bladder* are cut before the *Operator* either feels the *Stone* or sees any *Urine* running out.

I took a 3d Body, in the *Bladder* of which I put a very large *Stone*;

the *Staff* being in it, I made the *Incision* upon the fat *Protuberancy*, under the *Ischium* Bone, and piercing the *Bladder* below the *Staff*, I found immediately the *Stone* with the Point of the *Knife*, with which I cut the *Bladder* the Length of an Inch; through which having introduced the *Conduktor*, and then the *Forceps*, I got hold of the *Stone*, and drew it out very easily. Then I did *disssect* the Body; and found that neither the *Vesicula Seminales*, nor any *Artery* had been cut; by reason that the Weight of the *Stone* pressed the Bottom of the *Bladder* lower than the *Vesicula* and *Arteries*.

My Opinion is then, that this Way might be made use of when the *Stone* is very big, and willingly I would prefer it to the old Way; for by this Way we avoid that extraordinary and violent *Dilatation* of the *Neck* of the *Bladder*, which the *Stone* causeth when it is very big, and which is the Cause of the Inflammation and Mortification of the *Bladder* that killeth the Patient: But when the *Stone* is small, or of but an indifferent Bigness, the old Way is easier and surer. But I cannot approve of this Way at all on *Women*; since one cannot avoid cutting the *Neck* of the *Uterus*, the *Cicatrix* of which might prove to be of some ill Consequence, in case the *Woman* should come to be with *Child*: And therefore in *Women*, when the *Stone* is but indifferent big, the old Way is preferable to any other. But if it was very big, then I had rather to thrust my *Fingers* into the *Vagina*, and bring the *Stone* as near the *Neck* of the *Bladder* as can be, and cut the Membranes of the *Vagina* and *Bladder* upon the *Stone*. I cut a *Woman* in *Hamburgh* by that Way, from whom I drew a *Stone* weighing 5 Ounces and a half, who recover'd very well. By this Way we prevent the *Incontinency* of *Urine*, which followeth always the *Extraction* of great *Stones* in *Women*.

I cannot approve, neither, the *cutting* upon the *Gripe*, as it is practised by some *Mountebanks*; because in that Way one cutteth through the *Prostates*, which destroyeth the *Parts* of *Generation*. I have observed that all those which have been cut by that Method, were never fit for *Generation*.

The Way of
Cutting for the
Stone in the
Kidney; by Mr.
Ch. Bernard. n.
223. p. 333.

XCV. Mr. *Hobson*, who was *Consul* for the *English* at *Venice*, having been long afflicted with the *Stone* in the *Kidney*, was at length attacked with a *Fitt* of that Duration and Violence, that it reduced him almost to *Desperation*; and finding no *Relief* from any Means that had been used, and being under the greatest Extremity of Pain imaginable; he addressed himself to *Dominicus de Marchetti*, a famed and experienced Physician at *Padua*, imploring of him, that he would be pleased to cut the *Stone* out of his *Kidney*, being fixt in his Belief, that no other Method remained capable of relieving him; adding, that he was not insensible of the *Danger*, but that *Death* itself was infinitely more eligible than a *Life* in that *Misery*, under which he had long, and did then groan. *Marchetti* seem'd very desirous to have declined it, representing not only the extreme *Hazard*, but as he

he feared the Impracticableness of the *Operation*; that 'twas what he had never attempted; and that to proceed to it, was in effect to destroy him: But Mr. *Hobson* persisting that if he refused it, he would never desist till he found out one who would do it, *Marchetti* was at length, by his Resolution and Importunity, prevailed upon to undertake it; and having prepared him as he thought convenient, he began with his Knife, cutting gradually upon the Region of the *Kidney* affected, so long till the Blood disturbed and blinded his Work, so that he could not finish it at that Attempt. Wherefore dressing up the Wound till the next Day, he then repeated and accomplished it, by cutting into the Body of the *Kidney*; and taking thence two or three small *Stones*, he dressed it up again. From this Instant he was freed from the Severity of his Pain, and in a reasonable time was able to walk about his Chamber, having been in no Danger either from Flux of Blood or Fever. *Marchetti* continued to dress the Wound for a considerable time, but was not able to close it up, it soon becoming *Fistulous*, from the continual Flowing of the Urine through the *Sinus*; but being in all other respects restored to his former Health and Vigour, and the Matter discharged being little, he took Leave of the Professor, and returned to *Venice*, under the Care and Management of his Wife; who one Morning, as she was dressing the Sore, fancied she felt something hard and rugged as she wiped it; upon which, examining a little more carefully with her Bodkin, which serv'd her instead of a *Probe*, she found it to be a *Stone*, of the Figure and Magnitude of a *Date-Stone*; which being removed, he never after complained of the least Uneasiness in that Part.

About ten Years after this he returned to *London*, where the Learned Dr. *Tyson* and myself were, by Dr. *Downes*, who had known him formerly in *Venice*, invited to see him: And after we had received this Account from himself, he gave us the Satisfaction of viewing the Sore, which continued open, and permitted me, without any Complaint, (the *Callosity* being great) to pass my *Probe* so far into the *Sinus*, that we concluded it reached into the *Kidney*. The Matter it then discharged was but little in Quantity, but always diluted with and smelt strong of *Urine*. The Orifice would sometimes close for three or four Days together, and then the Matter made its way through the common Passages with the *Urine*, yet without any Difficulty or Pain. There is no question but that there was a Coalition of the *Kidney* and the Muscle *Psoas*. When we saw it, he applied nothing to the Orifice but a clean Linnen Rag, which had a strong *Urinous* Scent. He was then as able, in Appearance, to perform all the Functions of Life, and to undergo any Fatigue, as any Man of his Years; being then, I conceive, upwards of fifty, and was the next Day to ride Post forty or fifty Miles.

This, I think, is the first Experiment of this Kind. Some Authors indeed have imagined that *Hippocrates* hath commanded the *Operation*, when enumerating the Diseases of the *Kidneys* and their Cure, he saith, *Quum autem intumuerit & elevatus fuerit, sub id tempus juxta Renem secato, & extracto*

pure, Arenam per Urinam cientia, sanato. Si, enim sectus fuerit, Fuga spes est, scilicet.

De Intern. Af.

fin

*Antiph. Hip.
pocr. 4. Lib. 5.*

sin minus, Morbus Homini commoritur. And *Sinibaldus* in particular, upon these Words, passionately exhorts the *French* and *Roman* Chirurgeons to make the Experiment upon Brutes, that they might with greater Dexterity and Readiness perform it upon Men. But with Submission, he seems to infer more from these Words of *Hippocrates* than they can bear. For 'tis not sufficient (according to these Directions of *Hippocrates*) that we take our Indications from the common Symptoms of the *Stone*, be they never so grievous and never so evident; but there must be an *Apoſtem*, and that too is to manifest itself externally by a *Tumour*. And then indeed, the Necessity and Reason of the *Operation* are so obvious, and the Difficulty so little, that no Man ought to decline it. Nor do we want Instances of *Apoſtems* in the *Kidneys*, occasion'd originally from the *Stone* there, and manifesting themselves by a *Tumour*, upon opening of which, *Stones* have been discharged with the *Pus*, or have been soon after remov'd; and this is the very Case which *Hippocrates* supposes, and upon which he justly advises the Practice. But 'tis my Opinion, That we have no manner of Evidence, that *Nephrotomy* (restraining its Signification to cutting into the *Kidney*, for the *Stone*) was practis'd in his Time, or in many Ages after. For *Celsus*, although he be very particular in his Discourse of Cutting for the *Stone* in the *Bladder*, is silent in this Matter; and *Galen*, who is copious enough upon Diseases of the *Kidneys*, especially the *Stone*, mentions it not. And indeed, there are no Footsteps that I can discover among any of the *Greek* or *Latin* Physicians.

TraB. 4. c. 22. The first Light which I can pretend to discover of the *Operation*, as practis'd in our Case, is amongst the *Arabians*. *Serapion*, who is placed by *Wolfgangus Justus* betwixt the 10th and 11th Century, tho' by *Ren. Moreau* 300 Years earlier, gives his Opinion of it thus: *Quidam Antiquorum præceperunt Lapidem Renum extrahi cum Ferro incidente retro super Latus duorum Iliorum in loco Renum: Ego autem video quod hæc Audacia est difficilis vehementer, & Administratio istius Curationis ex maxime periculosa & suspecta de Morte.* Who these Ancients were that advis'd it, I confess to be beyond my Conjecture, unless we may be allow'd to say, That he also had misunderstood *Hippocrates*, as some have manifestly done since. Betwixt 12 and 1300, *Avicen* had much the same Opinion both of the Practice and Practitioners; *Sunt qui laborant extrahere ipsum per Incisionem Ilii & per Dorsum: Sed est magnus Timor in eo, & Operatio ejus qui rationem non habet.* The Difference of their Sentiments being only, That one thought it the Undertaking of a mad Man, the other of a confident Fellow; but from *Avicen's* Words, there is some Colour to believe that it was practis'd in his Days; tho' undoubtedly, if it were, from his talking so slightly of it, it was only by Persons of mean Character, such perhaps as our *Mountebanks*, who having no Regard or Concern for the Lives of Men, and little Reputation of their own to lose, venture boldly, and sometimes successfully, upon those Things which wary and more judicious Men avoid. All the rest of their Writers are silent.

*P. 361. Edit.
Ven. 1562.*

Among

Among the Moderns, as well as I can inform myself, *Fr. Rossellus* De Partu seems to have been the first, who seriously advised this Practice. But notwithstanding his Zeal to bring this Operation into Use ; and tho' he urges *Hippocrates's* Authority to justify the Cutting into the Kidney, he is yet so ingenuous as to acknowledge, *Præsentè Tumore, nec aliter, Hippocratem imperasse* Sectionem. And as plausible as his Reasonings may seem, it does not appear that he hath been able to gain many Profelytes to his Opinion ; the Sense of those Authors, who have mentioned it (who are not many neither) being generally against it, and concluding in Effect with *Riolanus*, *Nisi Natura monstrante viam atque præeunte, nefas est tentare Nephrotomiam*. But although it appears to be the concurrent Opinion of those Authors, who have treated of Wounds in the Kidneys, that if they penetrate the Pelvis, they terminate in Death, yet the Experiment above related shews us, that they ought not to have so Magisterially exploded the Operation.

De Partu
Celsus.

Ench. Anat.
Lib. 2. c. 28.

XCVI. I lately took notice in the Corpse of a Felon, that whereas ordinarily the *preparing Vessels* arise on the Right-side out of the Cava, as on the Left out of the *Emulgent*, his Right *Vas Præparans* sprang clearly from the Right *Emulgent*.

An extraordinary
Situation of
the Vasa Præpa-
rantia, by Dr.
Nath. Fairfax.
n. 29. p. 549.

XCVII. 1. Quid de *Testis* Substantia observaverim, en tibi geminis produco *Figuris* : quarum una est *Testis Virilis*, altera *Aprugni*, ut in tumentiori mole clariora legantur omnia.

The Testes ex-
amin'd; by Vade-
lius Dathirius
Bonglarus. n. 42.
p. 843.

AA, Uterque *Testis*, per medium scissus. *BB*, *Tunica Albuginea*. *C*, *Vasorum Præparantium* in *Albuginea* Insertio. *DD*, *Ductus Highmorianus*, per medios *Testes* exporrectus ; exactè in *Aprugno*, non item in *Virili*. An *Linea fibrosa Rioli* inseparabilis à *Testis Tunica* ? *EEEE*, *Vasa Præparantia*, *Albugineam* perforantia, & *Ductui* Semi-circulari nexu commissa. *FFFF*, *Genuina Testis Virilis* Substantia, nullatenus Glandulosa sed omnino Vafata : Ita ut totus sit totum *Vas Testis* ; in *Aprugno* *Vasa* interjacet *Testicularia* **** love stratum propriæ Carnis *ffff.GG*, *Exiles Fistulæ*, modo plures, modo pauciores, è *Ductu* ubi statim ex *Albuginea* emerit in *Capite Testis* exortæ. *HH*, *Principium Epididymidis* non Glandulosum, ex *Highmor.* sed solis contextum *Vasis*, ex *Riol.* valida sibi *Membranula* invicem adfuta. Hinc videre est, *Epididymida* ex *Fistulis* subortam, *Fistulas* ex *Ductu*. Atque adeo *Semen* inchoative generatur in *Teste* intra *Vasa Testicularia*, è quibus mox stillat in *Ductum*, è *Ductu* dein per *Fistulas* convehitur ad *Epididymida*, in cujus perplexitate tandem perficitur. *II*, *Reliqua Epididymidis Series* plane Vascularia, & ita in *Teste* & *Epididymide Virilibus* nil quicquam est Glandulosæ Substantiæ. *KK*, *Vas Ejaculatorium*, recta *Epididymidis* continuatio.

Fig. 47, 48.

2. This Paper was printed at Florence, 1658. Since which the Subject hath been consider'd by *D. de Graef*, and lately examin'd by the *R. Society* with so much Care and Exactness, that now there remains but little doubt of what is and has been so many Years ago conceiv'd, by able Anatomists here in England, of the Structure of the *Testicles*, viz. That they are a *Con-
geries*

By 1b.
844.

geries, or Heap of very fine *Vessels*, that may be drawn out like a Thread, and distinctly expos'd to the Eye.

*The Texture of
the Testes; by
Dr. Tim. Clark.
n. 35 p. 681.*

XCVIII. 1. Quod asserit Doctiss. *Van Horne*, (cum *D. de Graef*) *Testis* Substantiam non esse nisi *Conglomerationem* aliquam quorundam quasi Funiculorum, vel potius Vasorum minutissimorum, non solum hoc jamdudum constabat nobis, sed jam ante etiam Celeberrimo *Riolano* & aliis. Hoc addam ope *Microscopii* Funiculos istos videri ubicunque per minutissimas Glandulas transire; unde Similitudinem Pultaceæ cujusdam Substantiæ refert *Testis*. Tametsi vero in aliqualem Longitudinem Funiculi hi protrahi, possint, totam tamen ejus Substantiam quasi Lanam factam è Fuso explicari posse, nunquam adhuc potui experiri.

*By Sir Edm.
King. n. 52. p.
1043.*

2. In Nov. 1688, I dissected the *Testiculos Cuniculorum Marium* in several Shapes, and I find the Vessels in them to lie in round Folds, in the manner of the little *Intestines*, but both Ends of each Roll meeting at their Insertion, which seems to be made into the *Ductus Nervosus*: And every one of these little Rolls are very curiously embroider'd with other Vessels, which I judge to be Veins and Arteries, by reason of their reddish Colour; appearing in them even to the bare Eye. These little Rolls lie in Ranges, having a kind of Uniformity not unpleasant to behold by a good Light. When I cut one of these Rolls transverse, there seem'd to me five, six, or more distinct Tubes in one Roll, contain'd as 'twere in one common *Membranula*; but the fine Texture and Tendernefs of them is such, that they will not admit of Expansion in such a manner, as some other *Testes* will, and especially as that of a *Rat* is said to do by *Dr. de Graef*, if we mistake him not.

*Vid. Sup. c. I.
§. 2. XL*

It was asserted by me several Years ago, concerning the *Parenchyma*, that it is a Congeries of *Vessels* and *Liquors* without any intermediate Substance: And I have since that Time made several Experiments of the same Kind about the *Testes*, the *Pancreas*, and other (so esteem'd) *Glands*; and as far as I have examin'd them, I find them to be only a Texture of fine Tubes or Ducts, with more or less Liquor, without any other Substance.

I have also dissected the *Testiculos Tauri*, and ordered them several ways; some boil'd, others broil'd, others infus'd in Spirit of Wine, hot and cold, &c. and upon the best Examination I can make, I cannot see any of this intermediate Substance, or indeed any thing else, that is not *Vessel* or *Liquor*.

I shall also add another Experiment, and that is *Testiculi Humani*, hoping to put it out of dispute that it is nothing else but a Congeries of *Vessels* of various Sorts, and their several *Liquors*; and there is no such Thing as an intermediate Substance, (by what Name soever it be call'd.) To demonstrate this, I expanded on a Glass the true and genuine Substance *Testiculi Humani*, I mean, the Body of it after the *Tunica Albuginea* is removed, without any Addition or Diminution, excepting only what *Liquors* dry'd up during the time of the Expansion, (which could not be prevented in making such a Scheme of it;) and then it appear'd to the naked Eye as in the Figure.

Fig. 49.

If it should be objected, that this may be drawn out into seeming *Vessels*, which yet may not be really such; I answer, that these *Vessels* have the same Appearance in the Body of the *Testis*, as to denote them such, before they are drawn out; and in the Extention it does sometimes so happen, that one of them will extend easily near half a Yard long before it breaks, tho' so exceeding delicate and tender, as you may imagine: And when it is thus extended, it hath a kind of Resemblance to the Corrugations of the *Epididymis*, and keep the same Figure and Magnitude in the whole Extent of them, as to the Sight; unless they begin to dry, and then you may see them lose their *Gyrations* upon stretching: As you may see of both Sorts represented in the Figure, as they appeared on the Glass above-mention'd.

And that the greatest Part of these *Vessels* are Arteries or other Vessels that immediately receive Liquors from them, I may prove, I think, from another Experiment, made by Injection into a Part of the *Arteria Præparans*, before I went to expand the Body of the *Testis*; whereupon opening the Part which I saw discolour'd, I found that many of these Tubes had received some of the fine Particles of that Matter, which I tinged my Injected Spirit with.

And to prevent Oanother bjection that might arise, viz. That these Particles might possibly change their Colour only outwardly; I used other Endeavours to assure myself, that the said Particles were indeed included within the Cavities of these Tubes. In the doing of which, I did moisten those two Tubes with *Spirit Wof ine*, to see whether that would remove or alter those Particles: But finding no such Thing, I prickt and open'd with a fine Needle Part of the containing Tube; whereupon I saw issue forth several of those liquid Particles afore-mention'd; which assures me farther, that this is a mere Scheme or Congeries of Vessels.

3. Quod Cl. D. Clarck ait, se *Parenchyma* (quod Succum quendam denotare dicit Affusum vel Effusum & aliquo modo Concretum in Vascularum & Fibrillarum interstitiis) in *Testiculis Virorum*, & aliorum etiam Animalium, Testimonio Sensuum ostendere posse; hoc ego, pace tanti Viri dixero, non nisi *Autopsiâ* edoctus admittere possum. Quandoquidem sapissime *Hominum* aliorumve Animalium *Testiculos*, exceptis Tenuissimis quibusdam Membranulis, ita dissolverim, ut ne Umbra quidem talis *Parenchymatis* remaneret; imò, quod magis est, quorundam Animalium *Testiculos* ita dissolvi, ut visus acie ne quidem Membranulæ illæ conspicerentur. Et ut Verba mea factis comprobem, mitto ad te *Gliris Testiculum* meo modo dissolutum, ut videas, an *Glandula* tales in *Testibus* (quales proponit Clar. Dn. Clarck) vel etiam *Parenchyma* tale reperiatur. In hunc fere modum reliquorum Animalium *Testiculos* dissolvere possum, ea tamen diversitate, ut in nonnullorum *Testibus* aliqua Membranulæ tenuissimæ, & in quorundam, Radix præterea *Epididymidis Highmori* remaneat.

4. What these two last industrious Physicians have imparted, looks very fair to evince, that the *Testes* of Animals are made up of nothing but *Vessels* and their Liquors. But notwithstanding this, Dr. Clarck and divers other

Fig. 50.

By
P. 1047.

other ingenious and expert *Anatomists* and *Physicians* still doubt, whether that be so indeed, considering that not only it cannot be deny'd, that this curious Heap of Strings, or suppos'd Vessels, was at first cover'd all over with a mucous Matter, (which in so fine and tender a Part may be thought to serve for a *Parenchyma*) but also that *M. de Graef* must himself grant, that in the said Part there are found certain small Membranes besides those *Vessels* he is asserting; such another Substance being conceiv'd to be highly necessary to serve for a *Medium*, whereby that compounded *Liquor*, which from the greater *Vessels* passeth into the minute *Arteries*, *Nerves*, and *Lympheducts* of the *Testes*, may be secreted, and, according to the different Nature and Figure of their several Particles, convey'd into those several small and subtile *Vessels*.

By S. Malpighi. li. n. 71. p. 2150.

5. Interior *Testium*, præcipue *Equinorum*, *Tunica*, *Carneas Fibras* seu extensum *Musculum* in sui *Meditullio* una cum *Varicosis Vasis* continet, quæ diversas *Inclinationes*, ut in *Liene*, habentes, per transversum productæ & reticulariter implicatæ, *Intestinulorum* *Congeriem* firmant & comprimunt.

The Vasa Deferentia; by Dr. Timothy Clark, n. 35. p. 681.

XCIX. Hic tibi mitto *Figuram Vasorum Deferentium & Vesicularum Seminalium*, sicut illa ab *Exercitatissimo Lowero* & à meipso è *Corpore Humano* exacta fuere. Gratulor *Doct. Regnero de Graef*, vel potius mihimet, quod eandem veritatem, ni fallor, invenimus & asserimus: *Communio* enim illa *Vasorum Deferentium* cum *Vesiculis Seminalibus* ita manifeste se prodit, ut illi, qui per *Siphonem* liquores aliquos in *Vas Deferens* injiei curaverit, ne guttula *Liquoris* injecti per foramen in *Urethram* exire videatur, priusquam *Extremum superius Vesicularum Seminalium* attigerit.

Fig. 51.

In *Angulo* enim *A*, ita *communio* ista constituitur, ut *Vesiculae Seminales* prius totæ impleantur, quam *Liquor* ullus in *Urethram* possit exire. Agnosco etiam, per duo foramina *Semen* in *Urethram* injici; sed vix *Doctissimo Viro* possum concedere, unum solummodo esse materiam *Seminis*: Si enim *Testis*, *Mechanicâ Structurâ*, *Colore*, & *Substantiâ*, ab *Epididymide* differat, sicut *Epididymis* à *Parastata*; si etiam in his *Succi* diversi, & *Substantia* & *Colore*, inveniantur, diversæ procul dubio *Seminis* *Materiae* in illis conficiuntur.

Explication of the Figure.

Fig. 51. Exhibetur pars *Vasis Deferentis*, cum *Vesicis Seminalibus* unius *Lateris*; sicut in *Corpore*, antequam exacta illa fuere, apparebant. *A*, *Angulus Communions*. *B*, *Extremum superius Vesicularum Seminalium*. *C*, *Vas Deferens*, ubi *Siphonem* parvum inseruimus. *D*, *Foramen apertum* in *Urethram*. *aaa*, *Pars Vasis Deferentis*. *bbb*, *Vesiculae Seminales*. *ccc*, *Ductus à Vesiculis in Urethram*.

Two new Glands near the Prostate Glands, with their Excretory Ducts, lately discovered by Mr. W. Cowper. n. 258. p. 364.

Fig. 52.

C. About a quarter of an Inch below the *Prostate Glands* *E*, I found two other small *Glands* *GG*, placed on each side the *Urethra* *F*, a little above the *Bulb* of its cavernous *Body* *I*. These *Glands* are of a depressed oval Figure, not exceeding the Magnitude of a small *French Bean*. After those Parts of the *Musculus accelerator* *II* are removed, which pass over these *Glands*, you may feel them placed like two hard *Bodies* on each side the *Urethra*. They incline to a yellowish Colour, like that of the *Prostate*. Their

Their *Excretory Ducts* appear on their internal Surface *Ab*, next the inner Membrane of the *Urethra C*, whence they descend about half an Inch in Length before they grow less, and pierce that Membrane obliquely at their opening into the *Urethra D*, in which they discharge their separated Liquor. After opening the upper Part of the *Urethra* towards the *Dorsum Penis*, and expanding its inner Membrane, if you compress these *Glands*, you may see their Liquor issue from two distinct Orifices, which is very transparent and tenacious: These two Orifices open into the *Urethra*, just below its bending under the *Ossa Pubis* in the *Perinaeum*.

Fig. 53.

The Artifice of Nature is very extraordinary in thus placing these *Glands* and their *Excretory Ducts*, since on the Erection of the *Penis*, and the Distention of the Bulb of the cavernous Body of the *Urethra*, they are thereby necessarily compressed, and the Liquor contain'd in their *Excretory Ducts* forced through their two Orifices into the Cavity of the *Urethra*: Besides this, that Part of the *Musculus Accelerator* (mention'd above) which passes over these *Glands*, contributes to this Compression. It seems requisite such Agents should conspire in compressing these Organs, since the Liquor they separate is so very tenacious; which Consistence of it is so absolutely necessary for the Uses it is employ'd in.

The main Design of Nature in framing these *Glands*, seems to respect the grand Work of Generation, which will be more evident if we examine the *Analogous Organs* in other Animals. In *Rats*, these *Glands* are remarkably large, and are so placed, that, upon the Erection of the *Penis*, they are compressed by its Turgency and Apposition of the *Ossa Pubis*: The like may be observ'd in other Animals, particularly in *Hedge-Hogs*.

Boars have these *Glands* very large, and the Matter they separate is more tenacious, and not so transparent as in all other Creatures I have examin'd: There is something peculiar in the Contrivance of them in this Animal, each *Gland* being cover'd with a peculiar Muscle not unlike the *Gizzards* of some Fowl; which Mechanism seems contriv'd for more forcibly compressing of them, to discharge their very tenacious Contents into the *Urethra*, and that not only in the time of Coition, but at any other time; which seems to be more peculiarly requir'd in those Creatures, because the *Passage* of their *Urine* is very long, and therefore stands in need of more of this *Glutinous Matter* to besmear it, whereby it is defended from the Injuries that may arise from the *Salts* of the *Urine*. As the *Urine* of different Animals is more or less impregnated with pungent *Salts*, so the Proportion of these *Glands* differ, as well as on the Account of the various Lengths of their *Urethra's*. It is remarkable, we don't find these *Glands* in *Females* like those in *Males*, tho' they have something analogous to them, which are describ'd in *Women* by *De Graef*, and call'd, *Prostatae Mulierum*; but the Orifices of the *Excretory Ducts* opening at the Exit of the *Urethra*, they serve to defend the *Nymphae* and *Labia Pudendi* only from the *Urimous Salts*, and discharge their Liquor in *Coitu*, as I have elsewhere taken Notice; the whole *Urethra* in them being so short, that the Contraction of the *Sphincter Muscle* of the *Bladder* is sufficient to expel any Remains of *Urine* from that Passage.

The Use of these *Glands* is twofold; *First*, on the *Erection* of the *Penis* there is so much of their *Liquor* discharged into the *Urethra*, as suffices to drive out any Remains of *Urine*, and prevent its mixing with the *Semen*; and at other times, the continual Discharge of some part of their *Liquor* into the *Urethra*, defends that Passage from the *Salts* in the *Urine*. The like continual Exudation cannot happen either from the *Excretory Ducts* of the *Prostatae*, or those of the *Vesicula Seminales*, because the nearest of the *Sphincter Muscles* so corrugates the inner Membrane of the *Urethra*, as prevents an easy Passage of the *Liquor* by the *Ostiola* of the former; nor can the *Semen* run out of the latter, since the *Caruncula*, or *Caput Gallinaginis*, is contriv'd on purpose to prevent it: Wherefore the *Diaphragme*, *Abdominal Muscles*, and *Levatores Ani*, are employed in compressing those Parts to discharge their Contents.

It is not improbable that the Matter which flows at the latter End of the Cure of *Venereal Diseases*, and is call'd a *Gleet*, proceeds from these *Glands*, and not from the *Prostata* or *Vesicula Seminales*, as is commonly suppos'd; which may afford us no mean Argument for the Use of *Injections* in such Cases; instead of which some Practitioners persecute their Patients with violent Purges, and cram them with vast Quantities of *Astringent Medicines*. We may easily conceive such *Gleets* become sometimes very obstinate, if not incurable, by supposing the *Ulcer* in that Contact to happen upon the *Ostiola* of these *Secretory Ducts*.

Explication of
the Figures.

Fig. 52.

Fig. 52. A, A Portion of the Bladder of Urine. BB, Parts of the Ureters. CC, Parts of the Vasa Deferentia. DD, The Vesicula Seminales somewhat distended with Wind, by blowing into the Vasa Deferentia. aa, The Blood-Vessels of the Vesicula Seminales. E, The Glandula Prostata. F, The Urethra expanded, after opening its superior and fore Part, to see the Ostiola of the Excretory Ducts of the following Glands. GG, The two Glands above described, which from the Liquor they separate, may be called Glandula Mucosa. h, The Excretory Duct of the last mentioned Glands, before it passes under the Bulb of the Cavernous Body of the Urethra. I, The Bulb of the Cavernous Body of the Urethra, partly distended with Wind, and divested of the Accelerator Muscle, to shew its external Membrane, which is very thin, whereby the last named Muscle does more adequately compress that Bulb, and derive its contained Blood towards the Glans when the Penis is erected. K, The 3d Pair of the Muscles of the Penis. LL, The Accelerator Muscle divided in its middle Seam on the Bulb, and afterwards freed from it, and expanded. ll, The upper Part of this Muscle, which passes immediately over the Mucous Glands. MM, The Musculi Directores Penis. NN, The Cavernous Bodies of the Penis. O, The Cavernous Body of the Urethra. P, The Ligature, made to prevent the Wind from passing out of the Cavernous Body of the Urethra and its Bulb. Q, The Aperture by which the Inflation was made.

Fig. 53.

Fig. 53. One of the Mucous Glands after being macerated in Water, and its Excretory Duct filled with Quick-silver. A, The Mucous Gland somewhat

what distended. *b*, Its Excretory Duct. *C*, A Portion of the internal Membrane of the Urethra expanded. *D*, The Ostiola of the last mention'd Excretory Duct.

CI. In hoc obscurissimo omnium Viscere extra *Graviditatis* Tempus, ob contracta Vasa & in Varices contorta, ita implicitæ sunt componentes Particulæ, ut nulla fere arte distingui possint: In Turgente autem & Prægnante Utero (*Brutorum* præcipue) quædam emergere videntur. *Vaccinum* itaque Uterum, sum aggressus, cujus Copia facilius occurrit, & ex Magnitudine minus obscura sunt ipsius componentia. Hujus exterior Membrana densa valde sese offert, quæ Universum Uterum, *Tubas*, *Vaginam*, & Appendices, investit & firmat. Sub hac Carneæ Fibræ locantur, quæ per longum ductæ, & quasi in Carneos Lacertos interdum addensatæ, diversas inclinationes sortiuntur. Interferuntur autem ad invicem, præcipue versus *Tubas*, & non longè ab *Ovariis* in Fasciculos conglobantur. Aliæ quoque Horizontaliter secundum Crassitiem Uteri propagantur, hærentque Pelluculis tenuibus sub diversis Planis totum Uterum ambientibus. Non longè ab his occurrunt *Lymphatica Vasa* proprio turgentia Humore, qui admoto Igne tandem perspirat. Sub prædictis Vasis *Vena* & *Arteria* excurrunt hinc inde Uterum ingressæ, ita ut Rete elegans efforment, cujus Areæ diversam exhibent Figuram. Solent tamen, ut non raro observavi, Gemini Venarum Rami unicam concomitari Arteriam. Nervi quoque interferuntur, totam Uteri molem pervadentes.

The Structure of the Uterus, by S. Marc. Malpighi. m. 161. p. 630.

Alio quoque Vaso, seu Ductus, quæ Uteri propria sunt, insignia & per ampla *Graviditatis* præcipue tempore deprehendi. Horum itaque varia est productio, cum ab Uteri Substantia partim emergant, partim quoque interius lateant. Hæc gemina sunt, unum enim hinc inde Uteri & Vagina quasi Latera excurrit, ea præcipue in parte qua Uterus Vescicam respicit & contingit. Et licet ab extrema Vagina usque ad gracilescencia Uteri Cornua propagentur, non eandem tamen ubique redolent Speciem, nec consimili magnitudine donantur, aut sub eodem Plano feruntur. Inferior namque Portio, non longè ab Urethra Orificio terminata, immediate sub Membrana interiora Vagina custodiende sursum recta fertur versus Uteri Os. Hæc Portio frequenter vix Stylum admittit, interdum Auricularis Digiti Latitudinem æquat, unde lato Capitulo, evidentique Hiato, fere semper supra Urethra seu Urinarii Meatus Orificium, in Vaginam aperitur. Non longè à Plicis Os Uteri excitantibus, obliterari videntur hujusmodi Ductus, folique (prout visus sum attingere) minimi occurrunt Poruli & Meatus in continuatum Vas definentes. Hæc itaque obscurior horum Vasorum portio ab evidenti Ductu exorta, intra Carneas Fibras condita, sursum per angustati Uteri Latera propagatur, donec exterius à Cervice erumpens supra Uterum producta emergat. Varias sortitur Species hæc Vasorum Portio, & accuratam exigit Indaginem, ut evidenter patula reddatur; sæpe enim interius condita, ita gracilescunt hæc Vasa, ut quasi inconspicua reddantur: Non raro Globuli insignes & frequentes attolluntur, precariam Coronam æmulantes, & interdum turgente intus Humore rectus Vasorum progressus occurrit,

occurit. Emergens vero horum *Ductuum* portio ab *Uteri Cervice* supra *Carneas Fibras*, & sub *Sanguineis Vasculis* lateraliter producitur per *Corpus* & *Cornua Uteri*, quorum interiorem Circumvolutionem productus hinc inde *Ramis* irrigat, donec obscuris finibus in gracilescentibus *Tubis* obliteretur. *Vasa* hæc, licet *Tubulosa* sint & continuato ferantur tramite, ab ambiente tamen *Involucro*, seu *Ligamento*, & ab interiori ipsorum *Structura*, varie deturbantur, ita ut multiplices *Formas* acquirant; ea namque pars quæ *Uteri Vaginam* excurrit, sinuosa est, & recta sursum producitur. Ambiens interius *Membrana aspera* est, nam rotunda lateraliter habet *Orificia*; hæcque admissum *Stylum* non longius progredi sinunt, & interdum quasi *Glandulosi Folliculi* subrotundi appenduntur intro hiantes. Plures quoque per transversum extenduntur *Membranae Valvularum* instar, unde in aliquibus *Appendices* quasi cæcales excitantur, quales in *Intestino Colon* observantur. Prope *Urethra* *Orificium* latiora redduntur hujusmodi *Vasa*, & non raro *Sinuoso* quodam *Capitulo* turgent, à quo tortuosos *Ductus* intra *Vagina* concavitatem aperitur, ita ut gemina obscuraque *Orificia Urethra* hiatui proxima pateant. Superior vasorum pars, latera *Uterini Oris* excurrent, involucro quasi *Cartilagineo* custoditur; unde *Varicosa* redditur, & *Appendices* subrotundas hinc inde promere videtur, ubi præcipue ambiens *Vagina* in dispersos *Globulos* extuberat; in quibus vero contento intus *Ichore* turgēt, rectus efficitur *Tubulus*; ablato enim *Cartilagineo Involucro* tenella *Vasorum Membrana* manifestatur. Emergenstamen à *Cervice* portio, *Calami Scriptorii* magnitudinem & formam sortita, firmo involucro, etiam per aliquod spatium ambitur, deinde *Spirali* quasi *Ligamento* circumdata, elegantissimi *Vasis Speciem* adepta, sensim decrescit, & subrotundas interdum promit lateraliter *Appendices* *Succo* refertas, & ulterius elongantur, donec prope *Cornuum* curvatorum in *Ramulos* lacinietur, quibus gracilescentis *Uteri* portio irrigatur. Et quoniam admissum *Siphone* *Atramentum Vasorum* extremos fines non subit, ob contenti fortasse *Humoris Visciditatem*, ideo ultimus *Surculorum terminus* non attingitur. Interdum loco *Propaginum* *Appendices* seu *Loculos* observavi *Succo* turgidos. *Vasa* hæc in *Prægnantibus* una cum *Utero* ita elongantur & distenduntur, ut in *Vaccis* ultra *Longitudinem Brachii* extensa viderim, multoque tunc temporis *Ichore* turgentia, unde de facili obvia fiunt. Totam exaratorum *Vasorum* concavitatem *Subpallearis Succus* occupat, qui variam tamen in diversis partibus & individuis *Substantiam* sortitur; nam in *Sinuosa* parte, quæ per *Vaginam* excurrit, frequenter *Mucosus* est; & *Pultis* instar *Semiconcretus*, non raro observatur; in reliqua vero productione *Terebinthinam* *Colore* & *Lentore* æmulatur; *Ignique* expositus copiosas excitat *Bullas*, & tandem *Glutinosum Carabis* instar relinquit *Crassamentum*.

Ut autem singula hæc pateant, tibi que obvia reddantur, exarata *Vasa*, avulsâ *Urinariâ Vescâ* & ambiente *Membrana*, *Sanguinea Vascula* & *Fibrarum* *Implicationes* detrahes, ita ut exterior *Uteri* angustata portio, sub qua *Os* latitat, *Cervix* & *Cornua* denudata pateant, illico enim *Tubulosa* hæc *Vasa* hinc inde ultra *Uterini Oris* situm, in *Cervice* scilicet emergent, ipsorumque ulteriorem progressum supra *Cornuum* latera attinges. Inferior vero horum
Vasorum

Vasorum portio tibi patebit invento eorundem hiatu in extrema *Vagina* non longe ab *Urethra* Orificio. Interdum contentus in his Ductibus *Ichor* transparet ita, ut si interior *Vagina* Superficies lustretur, latæ videantur Lineæ per longum ductæ. Facto itaque Foramine Stylus immittatur, qui sensim penetrando totam quasi *Vaginam* excurret. Ut autem obscurior & intermedia horum Vasorum portio & continuatio pateat, erumpentis Vasis ex *Uteri Cervice* Involucrum descendendo sensim secabis; contenti namque Ductus Sub-lutea Membrana Semitam indicabit. Et licet Vasa hæc Gracilia & Varicosa existant, Sectis tamen per longum Carneis Fibris *Uteri* & Varicosis Globulis, postremo tibi occurrent. Interdum ubi turgēt *Ichor*, Vasa hæc Ampla & Recta facillimè obvia fiunt.

Superatis Vasorum, Fibrarumque Carnearum implicationibus & Tunicis; secto secundum Crassitiem *Utero*, in *Gravidis* præcipue, spatium quoddam seu Interstitium interdum semi-digiti per transversum occurrit, quod à Reticulari Contextura occupatur, qua Subvitellina quædam Corpora, Vasorum speciem habentia prout videre licuit, ad Interiorum *Uteri* Superficiem producta firmanantur; circa hæc ludunt Sanguineæ minimæque Propagines, ita ut quasi *Omentum* excitetur. *Uterus* interius Membrana quadam ambitur, quæ minima & innumera habet Orificia, Glutinosum Mucosumque fundentia Humorem, quo *Uterus* ipse & *Vagina* perpetuo madent: Quare compresso *Utero* profilit hujusmodi Mucosus *Ichor*. Patent autem hæc *Excretoriorum Vasorum Ora*, si diu interior *Uteri* Membrana aqua maceretur, & in *Ovibus* præcipue obvia sunt; quare probabile est Subvitellina exarata Corpora his Orificiis in *Uteri* cavitatem hiare; an vero his minimæ appendantur *Glandulae* licet Sensus distinctè non attingat, ratio tamen ex perpetua Naturæ operandi Norma probabiliter eas suadet. Observantur quoque quamplurimi in tota *Uteri* & *Cornuum* interiori Superficie Tumores inæqualis magnitudinis parum assurgentes, qui *Graviditatis* tempore insigniter turgent, & *Uteri* Appendices videntur, seu Vaginarum congeries, unde *Cotyledonum* nomine insigniuntur. Admittunt autem erumpentes à *Chorio* subintrantes Radices, ita ut ex his duabus infitis partibus completa habeatur *Glandula*, qua separatim ab *Utero* Alimentum *Fœtui* subministratur. Taliter igitur compactum corpus, geminaque integratum parte, *Placentula* seu Subrotundi parumque depressi corporis speciem habet, varioque inficitur Colore; ea namque portio, quæ ab *Utero* attollitur, Cinerea est, altera autem Subrubescit. Dimidiata *Uteri* *Glandula* Congeries est Vaginarum & Sinuum, quibus altè perfoditur, unde Atramento affuso manifestantur. Hujus Substantia parum differt à Velamento Bombycino, quo *Intestina* & Ruminantium *Ventriculi* interius obducuntur; Subrotundas namque Appendiculas promit, & compressa copiosum Succum Ptisanæ perfimilem reddit. Sanguineis Vasculis irrigatur, unde injecto per *Uteri* Arteriam Atramento toto denigratur. Interdum visus sum, obscure tamen, Subflavum quoddam attingere Vasculum, cujus ulteriorem indaginem tuæ Sedulitati relinquo. Altera *Glandula* pars *Chorio* adnata laciniatis quasi Radicibus coagmentatur, quibus exaratas Vaginas subintrat. Tibi autem pulchrum occurret Spectaculum, si evaginata hujusmodi pars intra aquam diu contenta *Microscopio* lustretur: Separatæ enim

enim Radiculæ & Capillamenta sensim ita attolluntur, ut elegantem Sylvam æmulentur; innumeræ namque quasi Plantarum Radices à communi Trunco propagantur, quæ in multiplices subdividuntur Surculos, & in Capillamenta laciniantur. Harum substantia non differt ab *Uteri* Vaginulis, & Sanguineorum Vasorum Propagines recipit, ita ut quælibet minima Radicula suis gaudeat Sanguineis Surculis, qui per medium perpetuo ducuntur.

Uteri Compages in *Mulieribus* adeo obscura est, ut pene impossibilem sui indicet Resolutionem; contracto namque *Utero* ita complicantur & Varicosa redduntur Vasa, ut nullus sit locus *Sectioni* etiam Accuratæ. Ea tamen tibi indicabo, quæ ex repetitis *Sectionibus Mulierum*, vel à Partu, vel circa Septimum *Gravidationis* Mensem defunctarum, observare potui. In his igitur *Uterus* crassitie Digiti latitudinem æquat, & Sanguinea Vasa copiosa recipit, quæ ramis Rete efformant. Exterius Fibre Carneæ in Fasciculos coagmentatæ, & reticulariter implicitæ, *Uteri* Structuram componunt, ita ut ipsius interior etiam moles sit Lacertorum congeries & complexus, qui variam fortiuntur Inclinationem. Inter exaratas Carneas Fibras copiosæ extenduntur Pelliculæ seu molles Tunicæ, supra quas ampli Sinus fere innumeri Vasorum instar per longum excurrunt, qui in diversis Planis superlocati, frequentibus Orificiis ditantur quamcunque Peripheriam spectantibus; unde inter proximos Sinus fit mutua *Anastomosis*. Horum speciem in *Mammarum* Tubulis, & in *Pene* habemus, in his nonnihil Sanguinis reperitur, ita ut videantur *Venarum* Diverticula, vel saltem ipsarum Appendices: non longè ab his excurrunt Sanguinei Surculi, non dispari ritu ac in *Liene* accidit. Interior *Uteri* Substantia avulso *Chorio* & *Placenta*, Musculosa occurrit vario Lacertorum complexu excitata, & à rimulis Sanguinea Vasa in Surculos divisa promit. Huic *Uteri* Superficie *Graviditatis* tempore Pelliculæ quædam adnascuntur, quæ *Chorio* præcipue & *Placenta* connectuntur; hæ Molles sunt & Mucosæ, facileque lacerantur. Ab his Rete quoddam fulciri & produci videtur, quod Cinereis quibusdam, & Friabilibus componitur corporibus, quæ Tereti forma pollent, & propagatis lateraliter Ramis in Retis formam implicantur, *Pisciumque Omentum* representant. Circa hæ Corpora Sanguinea ludunt Propagines varicosè ductæ & versus *Chorion* & *Placentam* elongatæ. An exarata corpora, Reticulariter implicita, sint Fibre Carneæ, an Nervi, an satius Excretoria *Uteri* Vasa, tuipe judicabis. Occurrit *Placenta Uterina* una cum *Chorio* firmiter *Utero* annexa. *Placenta* compositionem integre attingere non licuit, ob Friabilitatem & Mucositatem, variamque partium Implicationem. Illud tamen videtur certum, *Placentam* esse Vasorum *Umbilicalium* contexturam peculiari firmatam Substantiâ. Et sicuti *Cotyledones* propria donantur Substantia, quæ sanguinea Vasa fulcit, & eisdem loco Cribri vel Coli, inservit; ita *Placenta*, quæ est aggregatum ex *Cotyledonibus*, scilicet ex partibus *Uteri* Vaginulas subeuntibus, necessario congeries est Radicum & Surculorum Vasorum *Umbilicalium*, qui supra laciniatam Glandulosam Substantiam producuntur. Interdum visus sum Sanguineis propaginibus rotundos Globulos, seu Glandulas, quales in *Renibus* observamus, appensas attingere: immerita tamen in aqua *Placenta*, non occurrere hujusmodi Glandula, sed laciniata tantum corpora Sanguineis Vasculis irigata observavi,

observavi, quæ Plantarum Radiculas æmulantur. *Uterinæ Placentæ* Superficies, qua *Utero* necitur, inæqualis est, nam videtur appendicibus subingredi *Uteri Sinus* & Concavitates quasi *Cotyledonum* ritu.

Uterorum forma in singulis fere *Animalium Speciebus* varia est, & ab *Anatomicis* tam graphice describitur, ut nostram non exigit Expositionem. Illud tamen perpetuum videtur, Tubis ditari, quæ in *Plantarum Uteris* præ reliquis luxuriant. Non longe ab ipsis *Ovaria* locantur, quæ antiquitus *Testes* censebantur. In *Vaccis*, in quibus ampla & manifesta extant, obducta Membrana Fibris carnis firmata ambiuntur. Qua ratione *Ovum* ab *Ovario* emergat, & in *Tubas* transducatur, sollicita multaque eget indagine. Quæ tamen ex fortuitis *Ovarii* in *Vaccis* lustrationibus colligere potui, tibi brevibus aperiam; non enim licuit, ut in *Incubatis Ovis*, successivam Observationum Seriem ex mactatis statim tempore quamplurimis *Quadrupedibus* attingere, cum Regias fere Impensas exigit, quod *Harveo* & paucis concessum scimus. Illud itaque certum videtur in *Tenellis* & *Adultis Quadrupedibus*, & præcipue *Vaccis*, *Ovaria* complures continere inæqualis magnitudinis Vesiculas Colliquamento turgidas, quod Igne in *Albuminis Ovi* naturam concrevit. Non semel vidi ab *Ovario* pendentem Vesicam, quæ magnitudine *Gallinaceum Ovum* superabat, & *Albumine* concrevisibili referta erat. Vesiculæ hæc Tunica satis densa muniuntur, cujus interiori Superficiem (ut non semel observavi) Sanguinea Vasa miris plexibus irrigant. Tractu temporis Luteum, solidumque corpus emergit, in tantam excrescens molem, ut totam quasi *Ovarii* partem Papilla quadam protuberat; magnitudine, completo augmento, Cerasi Fructum æquat. Exterior Superficies aspera est, nonnullis exiguis Tumoribus inæqualibus excitata, Fibris Carneis ambitur, quæ, ut in *Glandulis* observatur, interius sese insinuant. Vasa quoque Sanguinea & *Nervi* excurrunt. Membrana involvitur, præcipue in Papillari appendice, quam communis *Ovarii* Tunica ulterius investit. Componitur exaratum corpus Frustulis & quasi Lobulis, ut in aliis Visceribus admirati sumus: hi autem Angulosi sunt, & variam fortiuntur Inclinationem: videntur enim appendi Sanguineis Vascularibus, & producto quasi *Umbilico*. Lobulorum compages obscura est, & varicosis propaginibus Lutei Coloris conflatur, quibus videntur Subrotunda corpora & appendices Aurei Coloris, & quasi Adipis minima Frustula neci & continuari. Interior Configuratio exarati Lutei corporis non eadem omnino quocunque tempore reperitur, sed varia occurrit. Interdum enim, ut à simplici exordiar, conglobatum, implicitumque observatur corpus varicosis productionibus Lutei quandoque Subcinerei Coloris contextum, quod vix Granum Milii, vel saltem Viciæ, excedit. Frequentius tum circa Vesiculas, Colliquamento seu Albumine *Ovi* turgidas, adhucque minimas, exterius Involucrum Lutea Substantia compactum & quasi capreolis excitatum obducitur. Non raro Luteum hoc corpus magnitudinem Ciceris pene adeptum, Pyrum figura æmulatur, & interius à Centro versus Collum sensim angustatum Sinum habet Colliquamento turgidum. Sæpe acquisita magnitudine Fructus Ceraforum, exteriori Papilla ab *Ovario* erumpens Vesicam Colliquamento refertam, Nuclei instar Ceraforum, in Centro continet, quæ interdum Rotunda est, & non raro plu-

ribus Styliformibus appendicibus donatur, frequentius tamen una tantum gaudet appendice. In completo quoque Luteo hoc corpore interdum nil fere occurrit contenti Colliquamenti, sed frequentissime ab interiori Tunica Papillam investiente, ubi Fovea exterius ut plurimum excitatur, & Foramen postremo excavatur, Cinereum quoddam corpus producit Membraneum, & fortasse Fistulosum, quod versus Centrum perpendiculariter elongatum in Ramos Vasorum instar dividitur, qui universam Lutei corporis compagem excurrunt, hisq; appenduntur Lobuli sub diversis inclinationibus. In aliquibus Adultis Luteis corporibus versus Centrum, & quandoque profundius, *Ovulum* cum appendice magnitudinis grani Milii observatur exarato Cinereo corpore contentum. Sæpe Meatus quidam seu Ductus aperitur, à profundo usque ad Papillæ Centrum productus, in quo Diaphanus stagnat Humor, qui Igne in Albumen concrefcit, & non raro *Ovulum*, vel gemina custodiuntur appendice donata, non valde dissimilia quoad formam ab his, quæ in Muscis Gallarum observantur. Postremo tandem Lutea hæc corpora effœta deprehenduntur sinuoso Ductu pervia, qui à Papillæ medio foras hiat, ita ut Stylum admittat: inclusa vero Cavitas magnitudini Pisi æquatur, & ambiente Membrana una cum continuato Ductu investitur. Hæc itaque in diversis Constitutionibus deprehensa, probabiliter evincere videntur, Luteum hoc corpus non solum pro Custodia *Ovuli*, ejusque Ejectione, à Natura excitatum esse, sed fortasse ejusdem Generationi conferre, hincque Glandulosum potius, quam Musculosum censendum esse; ejus enim Structura non est Fibrosa, nec Carneæ, sed potius succenturiatis *Renibus* persimilis; unde probabiliter dubitari potest per Glandulosum hoc Luteum Filtrum præparari & separari Materiam, quæ transmissa per Ramos *Umbilicalis* Vasculi, tandem in *Ovulum*, seu præviam Cicatricem *Ichore* contentam, immutatur. Hujus Analogam productionem in *Plantarum Ovis* intuemur, in quibus *Umbilicale* Vas primo emergit, cujus extremitas sensim laxatur & turgescit ex subingresso Colliquamento, quod tandem Plantulam manifestat. Ex his quoque dubitari potest, Vesiculas, quæ quocunque tempore in *Ovaris* copiosæ luxuriant, inæqualem sortitas magnitudinem & concrefcibili Colliquamento plenas, non esse vere *Ova*, quæ postremo fœcundentur, sed Materiam ex qua fortasse Glandulosum, Luteumque corpus primo excitatur. Non enim videtur certum, post *Coitum* tantum, Seminisque Masculini Affusionem, Luteam & Glandulosam manifestari Substantiam, & hanc fœcundati inclusi *Ovuli* Signa præferre; nam frequentissime in *Vitulis* nuper natis unam vel alteram Vesiculam insignem deprehendi, cui Lutea hæc Substantia Graminis instar adnascebatur. In *Vaccis* quoque Prægnationis præcipue tempore, & in diversa contenti Fœtus ætate, Lutea hæc corpora interdum Ciceris, modo Ceraforum fructum æquantia in *Ovaris* observavi, & hæc multiplicia, nec tamen Superfœtationis Suspicio aderat. Hoc idem in *Muliere* circa Septimum Graviditatis Mensem observavi, quin & in uno eodemque *Ovario* in diversis Animalibus plura Lutea hæc corpora inæqualis magnitudinis extant, in quibus non succedit tanta Fœtum Multiplicitas. His addam in pluribus *Ovaris*, concoctis præcipue, Vasa ampla Luteo Succo concreto turgere. Dubitari quoque potest non unicam Vesiculam Albuminis absumi pro generatione

one Lutei unius corporis, sed fortasse plures insumi; nam ubi perfectum extuberat Luteum hoc corpus, non solum totam ferè *Ovarii* Concavitatem occupat, sed frequenter pauca Albuminis Vesiculae adstant, cum alias copiosissimae numerentur. His itaque pensitatis non improbabiler colliges, Luteam hanc, Glandulosamque Substantiam non immediate subsequi *Seminis* Affusionem factam in *Ovo* intra *Ovarium* contento; sed longe ipsum antecedere, & subventanea quoque dari *Ova*: Vesiculas pariter Colliquamento refertas non esse rigorose *Ova*, sed Materiam, ex quo Glandula excitatur, cujus ope *Ovum* separatur, fovetur & stato tempore ejicitur. Erumpit autem *Ovulum*, forasque truditur, dum extuberans Glandulosi corporis Papilla ex Carnearum Fibrarum contractione extra magis exprimitur, & lacerata sensim tenui ambiente Membrana hiante *Umbilicali* Vase, vel Sinu, conditum *Ovulum* foras exprimitur; interdum etenim Papillam *Præputii* instar à Carneis Fibris *Ovarium* ambientibus revulsam vidi, unde patebat Hiatus in concavitatem Glandulosi corporis: *Ovulum* autem, ut in *Gallinis* accidit, contractis Carneis Lacertis quibus reticulare Opus Infundibuli, seu extremæ Tubæ conflatur abunde & secure excipitur, ut in Tubæ fœcundetur. Extruso itaque *Ovulo* sensim flaccescendo contabescit Glandulosum corpus; & de facili obliteratur, sicut angustatis Arteriis & Venis Glandulae & Viscera quoque fere abolentur.

Expositam hanc *Uteri* compagem meditati mihi quædam probabilia proferre liceat. *Uterus* ex Natura sua Vegetationis Ager est, in quo sata Semina, seu *Ova*, foventur, & viventis partes explicatiores redditæ manifestantur & firmanur; & licet à parente Fœmina *Ovum* decidat & feratur, inefficax tamen & fatuum est, ideoque *Masculini Seminis* Energiam exigit, à quo Vegetationis Principium inchoetur: quare ex Naturæ Legibus *Mulieres*, sicut & reliqui Viventium Ordines *Ova* promunt, quæ *Uterino* Sinu recepta, & *Masculino Semine* fœcundata in novum Animal explicantur. Qua ratione autem in Viviparis præcipue contingat *Ovi* Fœcundatio non eandem apud omnes invenies Sententiam; plerique enim censent, *Seminis* corpulentiam *Ovo* ipsi, *Ovario* adhuc appenso peculiaris cujusdam Ductus ope affundi: alii vero jam delapso, intraque *Uteri* Claustra concluso aspergi autumant; & postremo nonnullorum est firma Opinio, immutato totius *Uteri* Tono, infectoque Sanguine à *Virilis Seminis* Aura tandem conclusum *Ovum* Fœcundum reddi. Constat autem, Tibique diversos Animalium *Uteros* secanti sæpius patebit, anfractus & obstacula occurrere, quibus *Seminis* corpulentia ingressus in *Uteri* concavitatem intercipitur. In *Vaccis* Ichor quidam & lentus extillat Mucus; seu Gelatina, qua non solum interior *Uterus* madet, sed ejusdem Os obturatur, & superior *Vagina* Portio refertur; quare sicut *Seminis* corpulentia ingressum prohibere potest, ita ejusdem Auræ, & Spirituosæ Halitibus Menstruum & vehiculum opportune subministrare probabiliter potest. Extillans igitur Ichor ab exaratis superius Osculis, quibus *Uteri* & Tubarum interior concameratio pertunditur, non solum totum *Uterum* & *Vaginam* irrigat, sed effuso intra *Vaginam* *Semini* occurrit, ejusque volatiles Particulas coercendo sibi intime miscet, à quibus tandem fermentatur & turgescit. Hæc motio media partium contiguitate continenti *Utero* communicatur, ejusque fluidis particulis impertitur, ita ut in *Utero* & contentis Humoribus novus Tonus, Copu-

lationes & Motus succedant. Receptum igitur ob *Ovario* media *Tuba Ovulum* sufficienter irrorari potest, & Energetico illo *Masculini Seminis* Spiritu fecundari, à quo Motus Principium manifestari incipit. Hinc *Hippocrates* fortasse Siccos, vel plus justo Humidos *Uteros Steriles* dicebat; in illis enim Genitura vis non coercetur, nec propagatur; in his vel dissipatur, vel effluit, ita ut in Temperatis tantum Conceptus subsequatur. Simile quid miramur in *Papilionibus*, in quibus ingens Bicornis Vesicula extremo appenditur *Ovario*, à qua glutinosus perpetuo extillat *Ichor* in concavitatem *Vagina*, quo *Masculinum Semen*, aliisque etiam à laterali *Loculo* eructatus humor excipiuntur & foveantur, quibus omnibus pertransientia *Ova* irrorantur & fecundantur, & ita per plures dies Plastica illa Vis conservatur, & subsequentibus diebus excurrentibus *Ovis* communicatur; quod pariter in *Gallinis* conjectari licet, in quibus *Seminis* semel recepti Energia non parum conservatur, ita ut successivo etiam tempore *Ova* fecundentur. Et quoniam Natura in *Gallinaceis* non solum Cicatrici, in qua partium Rudimenta latent, Galli *Semen*, vel aliud Menstruum ab eodem fecundatum aspergit, & affundit, sed totum *Ovum*, Alimentum scilicet, sub Specie Albuminis & Vitelli vi Plastica irrorat, ita ut totum fecundetur; ideo cum *Uterus* Humoribus turgidus *Ovulum* ambiens Analogus sit Gallinarum *Ovo*, ipsum quoque una cum contentis Humoribus fecundari probabile est: hoc autem interius extillans ab *Utero* *Ichor Semine* turgidus præstare potest. An vero *Uterina Vasa* superius exposita huic fecunditati aliquid conferant, dubitari potest. Et primo probabile est, contentum Succum *Fæminei Seminis*, vel saltem *Prostratarum* *Ichoris* loco esse, & inde Incitamentum & propriam Energiam una cum *Masculino Semine Ovo* communicare posse. Quoniam tamem hæc *Vasa* per longum *Uteri* producuntur, & extremis finibus ejusdem *Cornua* irrigant, Glutinoso pariter Succo turgent *Graviditatis* præcipue tempore, ideo mihi dubitandum occurrit, *Masculini Seminis* volatilibus Particulis non parum immutari contentum in hujusmodi Vasis Humorem, indeque exteriores & præcipue *Cornuum* partes fecundari, in quibus fit primæva Conceptio, & successiva Fœtus Auctio & Nutritio. Nec tibi improbabile hoc videbitur, si Mente revolves, hujusmodi Humorem *Masculino Semine* de facili alterari, cum passim ex unico, soloque Concubitu cum *Lue Veneræ* infectis, totus ita inquinetur Humor, ut Acidior redditus perpetuam sibi viam affectet, & semel inspiratum Miasma diu conservet. Delapsum itaque ab *Ovario Ovulum*, & Menstruo *Uterino* utriusque *Seminis* Volatilibus Particulis turgido aspergitur. *Uterus* quoque interius & exterius, contentique in eo Humores ita turgent, ut Sanguis novo recepto motu intra *Vasa* non parum subsistat, *Cotyledones* extuberent, & fluidis redditis, & ad motum pronis omnibus, inclusi in *Ovalo* Fœtus Nutritio & Auctio celebrentur.

Varia est Natura in Mechanico illo Apparatu, quo à Vasis *Uteri* in Fœtum Succus transducitur; nam *Placenta*, vel quid Analogum frequenter intercedit. Exarata *Cotyledonum* Structura superius exposita præ reliquis elucescit; est enim sui generis Glandula Conglobata, in qua Portio *Uteri* propria carne donata receptum ab *Uterinis Arteriis* Succum percolat, qui separatus in Sinuosis Cavitatibus recolligitur, donec sensim fistulosus alterius Glandulæ partis Radiculas subeat, & *Venarum* Surculis excipiat. CIL.

CII. Jan. 6. 1669, M. Benoit Vassal, Chirurgion at Paris, opening the Body of a Woman of 32 Years of Age, of a Sanguine Constitution, and a Masculine Port, found two *Matrixes*. They were so well disposed by an extraordinary Contrivance of Nature, that the true one had conceived eleven several times, viz. 7 Males, and 4 Females, all born at the full time, and all perfectly well formed: But they were at last followed by a Brother, yet a *Fœtus*, that was conceived in an adjunct *Uterus*, in a place so little capable of Distention, that seeking Enlargement, after it had caused to the Mother for two Months and a half grievous Symptoms, did at last, being of the Age of about 3 or 4 Months, break Prison, and found its Grave in that of its Mother, by a very great Effusion of Blood in the whole Capacity of her *Abdomen*; which cast the Mother into such violent Convulsive Motions for 3 Days together, that she died of them.

A Woman with a Double Matrix; by M. Benoit Vassal. m. 48. p. 969.

Fig. 34.

A, *Pars Vaginae*. B, *Orificium Internum Matricis apertæ*. C, *Collum Matricis*. D, *Cavitas Matricis*. E, *Linea separans cavitatem Matricis*. F, *Uteri Fundus*. G, *Duo sinus inventi in Fundo Uteri*. HH, *Crassities Uteri*. II, *Ligamentum Latum*; sive *Productio Peritonæi lateris Sinistri*, continens in *Plicatura sua Vasa Deferentia & Ejaculantia*. K, *Arteria Spermatica*. L, *Vena Spermatica*. M, *Testiculus*. N, *Verum Vas Ejaculatorium insertum Fundo Uteri per Sinum ibi inventum*. O, *Alterum Vas Jaculans*, quod ingreditur *Collum Uteri*, quod ejaculantur *Mulieres à Conceptu*. P, *Tuba Uteri*. R, *Ligamentum Rotundum*. S, *Ligamentum Latum ab ea parte, ubi spurius hic Uterus formatus est*. U, *Vena Spermatica*. T, *Arteria Spermatica*. Y, *Testiculus*. Z, *Pars Tubæ*. 2, *Verum Vas Jaculatorium quod Fundum Uteri ingreditur per Sinum supra dictum*. 3, *Alterum Jaculatorium, abiens in Uteri Collum*. 4, *Pars lacerata à Fœtu aucto*. 5, *Fœtus eo Situ, quo inventus fuit Amnio suo obvolutus*. 6, *Vasa Umbilicalia*. 7, *Placenta, Substantiæ cuidam Carnosæ adhærens*. 8, *Substantia Carnosa*. 9, *Ligamentum Rotundum*.

Explication of the Figure.

2. It may be, that which is by M. Vassal esteemed a *Second Womb*, is nothing else but the true *Matrix* lengthen'd, or that which by Anatomists is called *Tuba Fallopii*. By ib.

CIII. A Woman, aged 44 and upwards, some time after she was marry'd, had Conceived (as she thought) by some suppos'd Symptoms of *Pregnancy*, and in order to her Delivery, at the Expiration of the Time of her Account, her Midwife was consulted. Her (fancy'd) Pains came on, and she thought herself very near her Labour. Her Belly was grown very big, and had gradually increased from the time of her (imagined) Conception; but alas, she found herself deceived in her Expectation, and her Preparations for this time all in vain. Her Illness wore off, without leaving any Prognostick of an approaching Birth. Thus she continued, growing bigger and more indisposed, and took much Physick, but without any Relief, those whom she consulted not knowing what her Distemper was. At last,

A Woman Hydropical in the External Tumour of the Uterus; by Mr. Turner. n. 107. p. 10.

last, after more than three Years from the time she thought herself *Pregnant*, she removed into the Air, where she had not continued long before she languished and died.

The Corpse being laid as advantageously as might be, we began our *Incision* from the *Umbilicus*, transverse the *Abdomen* to the *Iliac*; and from the same Center another *Incision* direct to the *Os Pubis*. Here was now an Expectation on all hands of something Rare and Monstrous, when on a sudden one of the Dissectors (little thinking what was so near) in cutting through the *Peritonæum*, accidentally thrust his Knife too far, and immediately there arose a Spring, as it were, of a *Limpid Serum* or *Lympha*, as clear as Water from a Fountain, rising up a very considerable Height, and with great Impetuosity. Having emptied the containing Part of its Water, which in Quantity did somewhat exceed two Gallons, we found its Enclosure was a thin transparent Membrane. And when I had turned this Membrane to the Right Side, I perceived underneath this outward *Tunick*, or (as I thought) adhering to it, a more Carnous Substance. We then divided the *Os Pubis*, and passed in a Probe through the *Pudenda* into the *Vagina Uteri*, and having traced it as far as it went, by looking into the *Pelvis*, and searching for that Carnous Substance I have already spoken of, we found it to be nothing less than the *Uterus* itself; when cutting into its Body, we perceived the End of the Probe already entered into the *Cervix* or Neck thereof. So that (what seemed to us strange) we were at length ascertained of the Truth, and convinced, that the aforesaid Water was contained in the External *Tunick* of the *Womb*, whose great Weight had thrust the Body thereof perfectly on one side, and hindered an Admission of Search from the *Vagina* towards the *Fundus Uteri*, the *Cervix* thereof being kept close as in a true Conception.

One of the great Indications of this Woman's *Pregnancy*, was a Flux of a Whitish or Pallid Humour to her *Breasts*, which she could squeeze out at Pleasure, and thought it to be no other than *Milk* generated therein, in order to the Nutrition and Conservation of a future Birth. She had likewise labour'd the greatest Part of the time under a Suppression of the *Menses*, whose Reflux to the *Breasts*, when an Alteration had been induced by its Glandules, might, as I conjecture, (issuing from the *Papilla* under a Subalbid Form) be taken for *Milk*, and give Grounds of the Suspicion that she had conceived.

A Woman Hy-
dropical in her
Left Testicle,
by Dr. Henry
Sampson. n.
140. p. 1000.

CIV. This Woman was about fifty Years old, had been married, but had never borne Child; had been a Widow for about ten Years before her Death, in which time she was much oppressed with Grief, and her *Belly*, by Degrees, began to swell; yet not much, till about four Years before she died. In the Year 1677, at which time she weigh'd 216 lb, I advised her to the Use of *Cathartick Hydragogues*, and *Diureticks*; after the Use of which, for some time, she weighed but 200 lb. But still the Morbifick Matter was re-accumulated to the diseased Part; so that resolving to forbear farther Medicines, within half a Year after she weigh'd 250 lb, her *Belly* being,

being, at last, so far distended, as to hang down, as she sat, a good way below her Knees.

Being called to open her, I put a Pipe into the Cavity of the *Abdomen*; but hereupon there issued only some Drops of *Serum*, like the White of an Egg. At another Place there ran about 20 lb of a brownish Water or *Serum*, one of the Vesicles, hereafter mentioned, being pierced. Having separated the Muscles of the *Abdomen*, I found no *Serum* or *Hydropick* Water therein; but a Heap of Bladders, of several Sizes, presented themselves. From the greatest whereof, being pierced, there issued about 20 lb more, of a brown and thickish *Serum*, tinged with a Sediment of the Colour of Amber. Some of the lesser were about the Bigness of a Child's Head, which yielded a slimy *Serum*, in Consistence and Colour, like the Mucilage of Quince-Seeds. Others were much less, some as big as a Man's Fist, some as an ordinary Apple, and some as a Walnut: In most of which was contained a *Serum* like to the White of an Egg; in some of them, much less Viscous and somewhat White, like Starch newly boiled. At the length I perceived, that all these Bladders were Parts some way relating to the *Womb*. Wherefore having separated the *Ossa Pubis*, I took out the *Womb*, with the *Pudendum*, and Parts appendent, all together. And then, amongst other Particulars, observed, that the Right *Testicle* or *Ovary* was but small, white, and its Vesicles in a manner dried up; but the Left to be swell'd into a vast Bulk: The aforesaid Bladders, in one of which were contained so many Pounds of Liquor, being nothing else originally but the *Eggs* belonging to this Left *Ovary*. Imagine you saw about forty Bladders, some of a little Pig, others of a Hog or a Calf, and some of an Ox, all distended with Liquor, and tied like a Reeve of Onions altogether, and you have also seen this *Ovary*. The *Testicle* or *Ovary* itself, all the *Serum* being exhausted, weighed (together with the *Womb*, which was but light) 25 lb. Out of all the said Vesicles or Bladders together, were exhausted above 112 lb of *Serum*.

CV. Mrs. Brown, aged about 29, of a Sanguine Complexion, had been married about four Years, in which time she had had one Child: Her *Belly* swell'd, and she thought she was with Child; she had often great Hysterick Fitts, something like those of an *Epilepsy*, lying in her Fitt sometimes without Sense or Motion, at other times with great Screaming and idle Talk. These, with proper Remedies, were removed at several times with Difficulty. Coming to be about six Months gone with Child, (as she thought) she began to have some Doubt whether it were so or not, because she had her *Catamenia* very regularly. I was of Opinion she was not with Child, and would have treated her with Steel, and Purges of Water, as *Hydropically* disposed Bodies require; but she fancying she felt the Child stir, put a Stop to that Course, and went on expecting the good Hour, having prepared all things for the Child (to be born) and herself during her Lying-in. She delay'd the propos'd Method for 3 or 4 Months beyond 9, thinking she had counted wrong; but at last she was persuaded to Medicines, and underwent a very strict Course, as for *Hydropick* People; her Legs did not swell nor pite; her Belly

was

A Dropsy is one of the Ovaries of a Woman; by Dr. Hans Sloan. n. 252. p. 150.

was unequal, and the Swelling more of the Right-Side, so that the Navel was thrust over to the Left Side. She had also resolving Plaisters apply'd to her Belly, but all in vain; excepting that with much Anxiety, Gripes, and Trouble, so much Water might be evacuated, as to bring down her Belly 3 or 4 Inches. At last, after she had consulted other Physicians and some Quacks, she hearkened to a *Paracentesis*, which was proposed by some, and after a suitable Prognostick, was resolved on and performed at several times, by discharging great Quantities, of first a limpid thick Serum, as Whites of Eggs, insipid and coagulable into the like Substance by Heat; it came afterwards to the Colour and Consistence of thin Honey, and coagulated on Evaporation. In some time she fell into a Fever, with a great Thrush, Hickups, and in about nine Days died.

Out of her Body, when dissected, was discharged some Buckets of the same Watery Substance that had been discharged by the *Paracentesis*: Part of this was floating in the *Abdomen*; but far the greater voided out of great and thick Bags, some of which were as large as the Stomach, others smaller, many of them rotted to Pieces, and all of them in the Right *Ovary* or *Testicle*: The *Uterus*, *Tuba Fallopiana*, and every thing else being sound, bating the *Omentum*, which was quite consumed. What was very strange was, that several Bags of the larger Size in this *Ovary* contained others smaller within them; and those which were larger, were filled with a Mellaginous Liquor; those smaller with one like Whites of Eggs. Here and there between were *Apostems*, which were but small, and filled with yellow Matter. The *Gall-Bladder* was full of several triangular yellow *Stones*. She was very lean all over her Body, and never had her Legs swell or pitt; nor the Noise of Water on her stirring in Bed, till some small time before the *Paracentesis*; when she fell into so great an *Orthopnea*, that she could not, unless erect, breathe.

An Embryo
of four Weeks;
by Dr. Phil. Ja.
Hartman. n.
238. p. 66.

CVI. Matrona 40 circiter Annorum, tertium hunc *Abortum* faciebat 27 Sept. 1685. Ante 4 *Septimanas* ipsi *Menses* adhuc fluxerant, tertio autem qui *Abortum* præcessit Die, Linteis Lavigandis operam navans, & Cylindris ducendis manum admovebat; exin Die dicto Sanguis Grumosus magnâ copiâ erumpit, quum aliâs *Uteri Hemorrhagiâ* esset obnoxia, successit tandem *Placenta* cum *Chorio*, *Amnio*, & *Fœtu*, formâ Ovi integri; quod *Ovum*, citra ullam aliorum contractionem ac palpationem, Domum auferre licuit, ubi Otiosus omnia rimatus sum.

Explication of
the Figures.

Fig. 55.

Fig. 55. *Placenta* structuræ exterioris, quâ *Utero* adhæsit, partem *Cotyledoniformem* exhibens. *a a a a*, Magnitudo *Placenta*, quæ totius *Uteri* Cavitatem implevit. *b b b b*, Pars *Cotyledoniformis* meris Glandulis Globosis obfita; Glandulæ in medio Rubicunda puncta ostendunt Vasorum Ruptorum ora hiantia: circa puncta sunt Foveolæ quasi impressæ, quas & *Skeleton* monstrat: Huic parti *Cotyledoniformi* intus appositæ erant Vesciculæ, Rubicundo & Flavoliquore distentæ, quas Fig. 57. exprimit. *c c c*, Lõca in quibus Sanguinei Ductus insigniter erant conspicui.

Fig.

Fig. 56. *Placentæ Structuræ exterioris, quâ Utero adhæsit, partem alteram exhibens.* *A*, Locus ex quo Vasa longiora avulsa dependebant; ubi *Placentæ Utero* firmitus annexa aut agglutinata fuit. *BB*, Lacinia *Placentæ* gracilescens. *C*, Foramen per quod *Chorion & Amnion* prominebant. *DDDD*, *Placentæ* Globus quem omnes *Figuræ* repræsentant ut totius *Uteri* Cavitatem à *Placentæ* succinctam fuisse, *Fœtumque* in eadem tanquam in altero *Utero* sive *Utriculo* contineri constet.

Fig. 57. *Placentæ Structuræ interioris pars prior cum Embryo.* 1, Vescicula insignior Sanguine Rubicundo turgida. 2, Vescicula alia Flavo Liquore repleta. 3, Vescicula maxima Flavo Liquore distenta. 4 4 4 4, Vesciculæ circumscriptæ minores, varia proportionem, varioque Liquore, Rubicundo, Flavido, Limpido, plenæ. 5, *Umbilicalis Funiculus* cum Vasis. 6, *Embryon*; *Figuræ*, Magnitudinis, Manuum & Pedum Sitûs, Penis, Podicis Caudati, Foraminis *Ani* quasi à Meconii nigrore punctati, Helices Auriculæ, Riçtûs Oris, accuratâ omnium Delineatione. 7, Locus in quo *Funiculi* Tunica Vesicularum latebris se insinuabat. 8 8 8 8 8, Spatium Vesciculis vacuum, *Chorio & Amnio Placentæ* crepidinibus annexis.

Fig. 58. *Placentæ Structuræ interioris pars altera sine Embryo.* 1 1 1, Vesciculæ variâ Magnitudine, varioque in eis Liqueurum Colore. 2, Vasa sanguinea hinc inde commeantia. 3 3 3, Spatium Vesciculis vacuum, *Placentæ* Expansionem cum annexa *Chorii* Tunica ostendens. 4 4 4, Lacinia *Chorii* cum *Placentæ* divulsæ parte graciliori. 5, Foramen à *Placentæ & Chorii* rupturâ.

Fig. 59. *Embryon* exhibens. *A*, *Embryi* Corporis habitudo. 1, Linea Alba *Frontem* dividens. 2, 3, Duæ aliæ Lineæ Albæ ad *Suturam Coronalem* tendentes. 4, Duo Puncta quæ *Narium* Foramina designant. 5, *Helix Auriculæ* Albicante Lineâ discreta. 6, *Penis*. 7, *Pedum Digiti* inæqualiter desinentes, cum exiguis lineis Fissurarum Indicibus; eadem ratio *Manuum*. 8, *Caudæ* eminentia, cum punctato *Ani* Foramine. 9, Oris Riçtus. 10, *Medulla Spinalis* Albicans, utrinque à se versus Latera exiles lineas Albæ, æqualiter curtas, dimittens. 11, *Umbilicalis Funiculus*, per cujus Tunica exilia Vasa transparent.

CVII. It is much controverted, Whether a *Fœtus* does respire while in *Utero Materno*, there being only a continued Circulation from the Mother to the Child, and from the Child to the Mother, by means of the *Placentæ* and *Cordon*; so that the *Lungs* of the Mother serve for both; and that the Blood circulates a much shorter way by the *Canal of Communication* and *Foramen Ovale*, without passing the *Lungs*, than it does after the Birth, the Child having then the proper Use of its own *Lungs*; the former Passage being so mechanically stopp'd by a *Valvule*, that the Blood quite alters its former Channel or Course, as I have seen it, to my great Pleasure and Satisfaction, demonstrated on several *Fœtus's* dissected on that Account in the private Lectures of Mr. du Verney. And that the thing may appear more clear, I shall mention two Opinions that obtain most as to the *Nourishment* of a *Fœtus*.

The Respiration and Nourishment of a Fœtus in Utero Materno, by Dr. Charles Preston. n. 226. p. 464.

The *First* is, that there are a Number of *Glands* in the Internal Tunick of the *Matrix*, which all the time of Child-bearing filter and separate from the Blood a White Liquor, like unto *Chyle*, that is received by the *Glands* of the *Placenta* (which is nothing but a Heap of *Glands* and *Vessels*) that are join'd with those of the *Matrix*: Hence in Brutes they can separate the *Placenta* from the *Matrix* without the Effusion of Blood, but only of that White Liquor, the *Umbilical* Veins and Arteries being distributed to all the *Glands* of the *Placenta*; so that the Capillary Veins receive that Liquor with the Blood, and carry it to the *Vena Porta* of the Child, and from thence to the Heart, to be distributed through the whole Body; and what is superfluous, is carried back to the *Placenta* by the *Umbilical* Arteries, and so continues to circulate from the *Placenta* to the Child, and *vice versa*.

By the *Second* Opinion, they pretend that the *Umbilical* Vessels are dispersed through the *Placenta*, and that the Capillary Veins of the *Placenta* are *Anastomosed* with the Capillary Arteries of the *Matrix*, from which they receive the Blood that is carried to the Child for its *Nourishment*, and the remainder is carried back by the *Umbilical* Arteries, which are *Anastomosed* with the Veins of the *Matrix*; so that the Circulation is made from the Mother to the Child, and from the Child to the Mother, by means of the *Placenta* and *Umbilical* Vessels.

Which of these Opinions is the most probable, depends upon the Anatomy of the Parts; but any of them will serve my Turn, *viz.* to prove there is a continued Circulation from the Mother to the Child, and from the Child to the Mother. And to confirm it, I shall produce two or three Experiments which I had occasion to see performed. The first was on a *Fœtus*, by M. du Verney, where by blowing into the *Umbilical* Vein, and tying the Arteries, a little after the *Umbilical* Arteries were distended. The Second Experiment, performed also by M. du Verney, was upon the Dissection of the *Uterus* of a Woman newly brought to Bed; by blowing into the *Hypogastrick* Artery, the whole Vessels were filled, and the *Matrix* blown up; and for a farther Trial, he made an Injection, by which the Liquor came forth at the Orifices of the little *Glands*, which are dispersed through the *Matrix*. This Experiment cannot be performed but only in such Cases. The 3d Experiment I saw performed by M. Bidloo, Professor of Anatomy at Leyden, on a *Fœtus*, where by an Injection of Wax into the *Umbilical* Vein, the whole Vessels were filled, both Veins and Arteries; at which he was a little surprized, being contrary to his Doctrine. I could instance several other Experiments; but this is sufficient to prove there is a continued Circulation from the Mother to the Child, and from the Child to the Mother; so that a *Fœtus* seems not to *respire* but by the Mother; as M. Mery, in the *Memoires de l'Academie des Sciences*, has confirmed by several Experiments: The first was upon two Tortoises, by tying their Jaws strongly together, and sealing their Nose and Throat with Spanish Wax, to try how long they could live without *Breathing*: The first lived 31 Days, the other 32. Another Experiment was, by laying open the *Sternum* of a Dog, who died a little after; but having lifted that of a Tortoise, it lived yet 7 Days.

Although

und
Fal-
Wo-
Baf-
P.



Fig. 44.



Fig. 45.

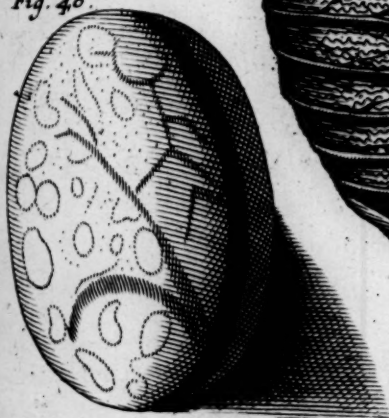


Fig. 46.

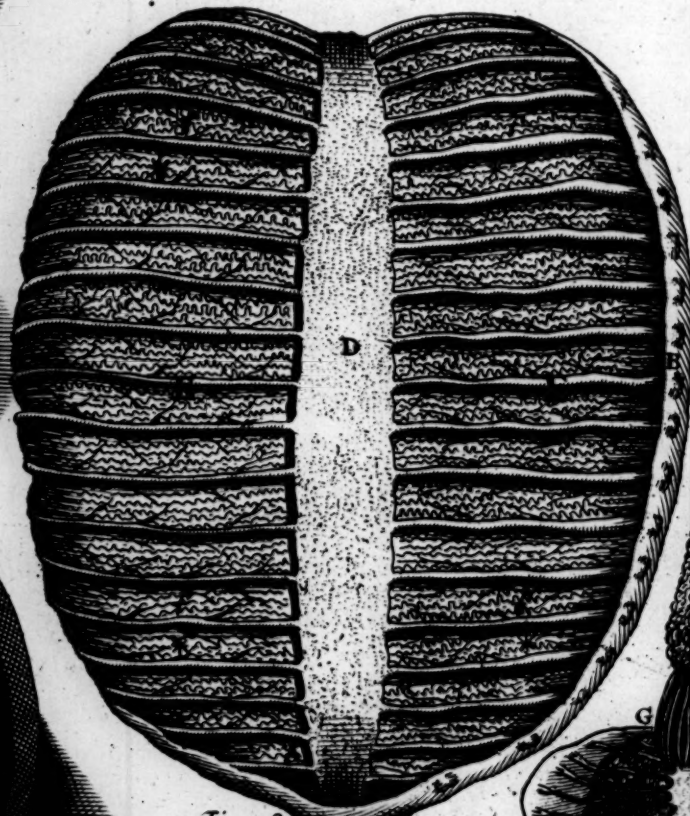


Fig. 49.

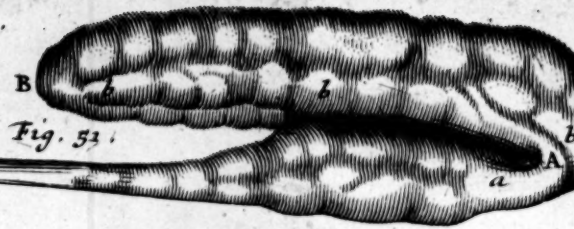


Fig. 51.



Fig. 47.

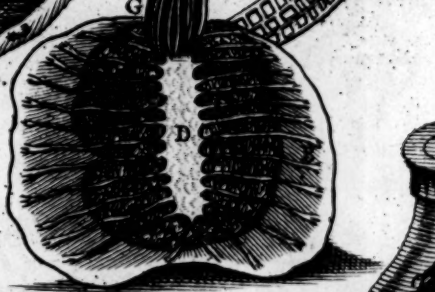


Fig. 50.





Fig. 49.



Fig. 53.



Fig. 52.



Fig. 57.

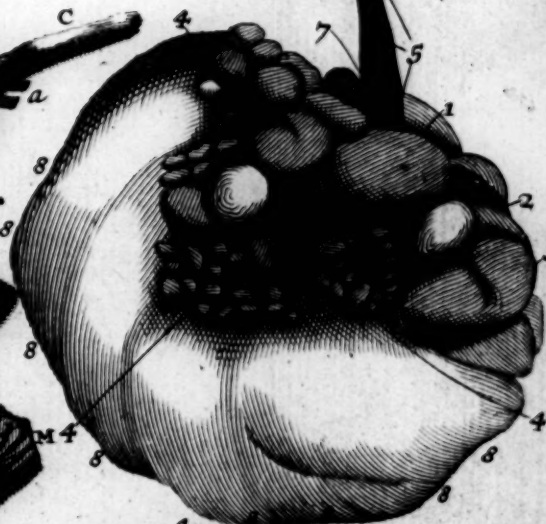


Fig. 55.

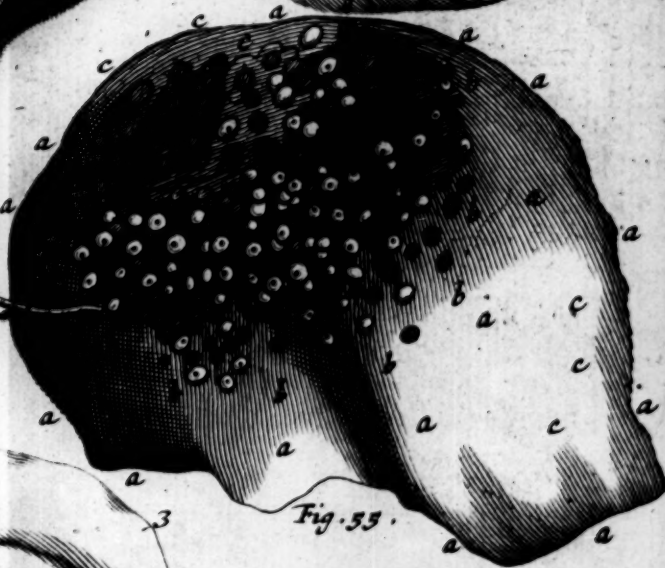


Fig. 56.

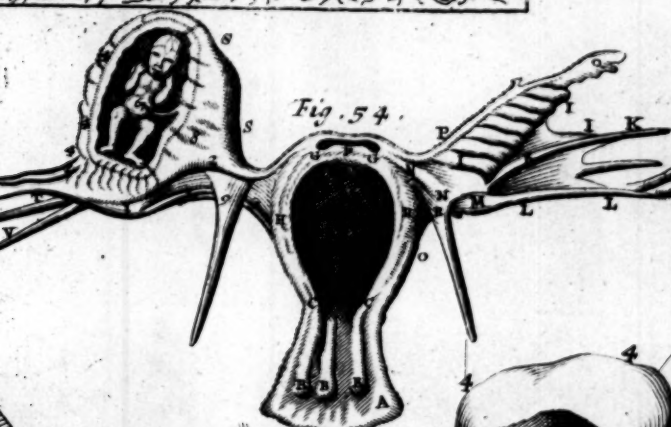


Fig. 54.

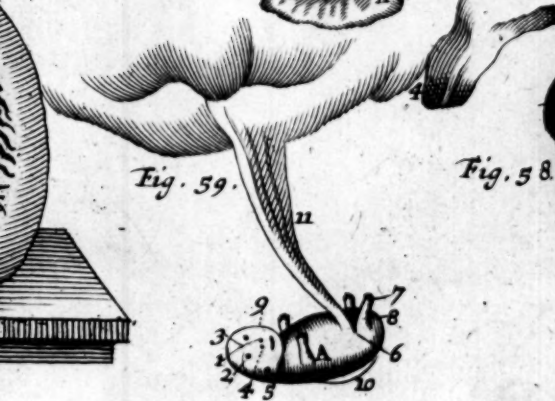


Fig. 58.

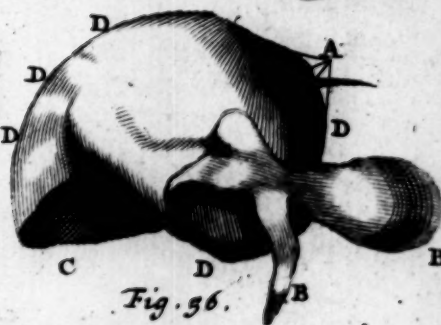
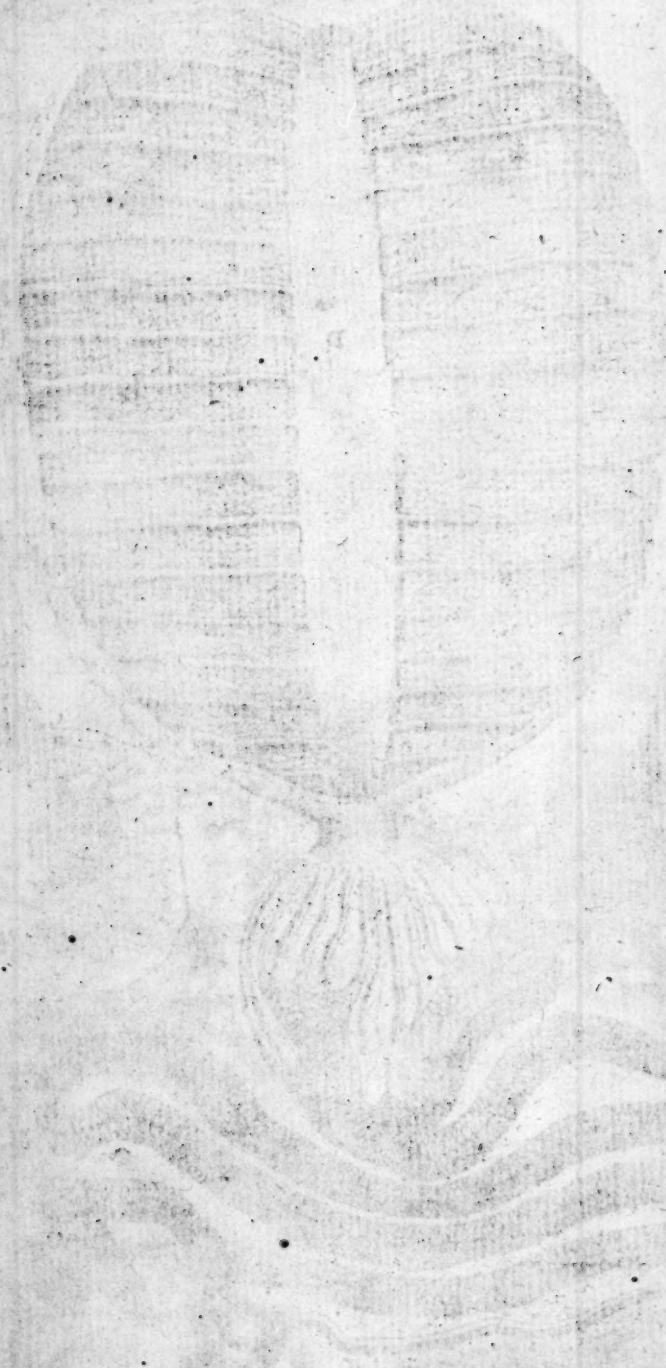


Fig. 59.



Although their Reasons seem to be strong, that a Tortoise can live so long without *breathing*, having the *Canal of Communication* and *Foramen Ovale* always open, yet *M. Mery* pretends they are not concluding, but by other Reasons quite different; and that is by the continued *Circulation*, as we have said above, as he has several times observed in *Accouchemens*: That if the *Cordon*, by which the *Fœtus* is tied to the *Placenta*, was so pressed, that the Blood could not pass from the Mother to the *Fœtus*, and that the Head of the *Fœtus* is engaged in the Passage, the *Fœtus* is choak'd in a very little time; but if the Head is come forth, the *Fœtus* dies not, altho' the *Cordon* be strongly compress'd by the rest of the Body.

CVIII. C'estoit une Jeune Femme, d'environ 25 à 26 ans, laquelle estoit *Accouchée* il n'y avoit pas long temps; ce que je reconnus, 1. par les Cicatrices de la Cuticule du *Bas Ventre* encore recentes; 2. par la Dechirure de la Fourchette dont la Cicatrice estoit toute nouvelle; 3. par la Grandeur de la *Matrice*; & en fin par l'Ouverture de l'*Ovaire* du costé Gauche, par laquelle l'*Oeuf* qui avoit servi l'Enfant precedent, estoit sorti, laquelle estoit encore fort large, & dont le rabord paroissoit encore un peu Dechiré: Cependant, quoyqu'il n'y eût pas long temps qu'elle fust *Accouchée*, soit par un esprit de Debauche, ou peut estre dans la Pensée que si elle devenoit grosse, on ne la feroit pas mourir, elle se divertit avec quelque Ami, ou peut estre avec quelqu'un des Prisonniers, de maniere qu'elle conçut: mais ayant esté exécutée avant que l'*Oeuf* Impregné de la *Semence Virile* eust eu le temps d'estre porté dans l'*Uterus*, lors que je l'ouvris, je trouvay que la *Trompe* du costé Gauche estoit extraordinairement dilatée vers son extrémité, & ceste Dilatation dans la plus grande largeur estoit d'un peu plus d'un Pouce de Diametre, & s'estendoit un peu plus d'un Pouce & demi en diminuant du costé de la *Matrice*. Cette Partie ainsi dilatée se recourboit & embrassoit presque tout l'*Ovaire*, à la Membrane du quel elle estoit si fort adherant, qu'elle n'en put estre detachée que par Force. Lors qu'elle en fust detachée, il en sortit une Liqueur Limpide & Onctueuse, laquelle servoit aparemment ou pour relacher les Membranes de la *Trompe*, à fin qu'elle se puisse dilater de maniere que l'*Oeuf* puisse couler aisement dans la *Matrice*; ou possible à fin de graisser ce Conduit à fin que l'*Oeuf* n'ayt aucune peine à y passer, & peut estre pour tous les deux. J'examinay d'abord si je ne pourrois rien remarquer dans le Corps de la *Trompe*, qui put produire ceste Liqueur: mais je n'y pus rien remarquer, bien qu'elle fust beaucoup plus Espaisse qu'à l'ordinaire. Cette Espaisseur estoit causée par le Gonflement de ses Fibres, qui estoient aussi charnus que ceux des Muscles ordinaires, ce qui arrive, sans doute, dans cet estat seulement, à fin de luy donner assez de Force & de Mouvement, pour exprimer l'*Oeuf* (apres qu'il est detaché de l'*Ovaire*) & le pousser dans la *Matrice*. Ma pensée est donc, que ceste Liqueur contenue dans la *Trompe* vient de l'*Ovaire*, & que les Fibres & les petits Vaisseaux *Lymphatiques* ou autres qui se rompent pour ouvrir un passage à l'*Oeuf* Impregné, y laissent couler ceste Liqueur, de sorte qu'encore que la Dechirure de l'*Ovaire* soit une playe & un Symptome, elle ne laisse pas d'estre utile, & de produire des Effects peut estre absolument nécessaires,

nécessaires, ou pour la premiere Nourriture de l'Oeuf, ou pour la facilité de son passage dans la *Matrice* : tant la Nature fait mettre toutes choses à Profit. Ce qui me confirme dans cette Pensée est, que dans les Femelles des Animaux, de l'Ovaire des quels se detachent plusieurs Oeufs à la fois, cette Liqueur s'y trouve en très grande quantité. J'ay depuis peu esté assez heureux que de trouver dans une Truie, la mesme Disposition que dans la Femme, dans laquelle les *Trompes* de chaque costé qui embrassoient l'Ovaire contenoient chacune environ trois à quatre Onces de cette Liqueur.

La *Trompe* estant detachée de l'Ovaire, & la Liqueur es coulée, l'Oeuf parut à decouvert ; il estoit de la grosseur d'une Noisette entouré de la Liqueur au milieu de la cavité dilatée de la *Trompe*, les trois quarts de cet Oeuf estoient desja hors de l'Ovaire, par le trou qu'il y avoit fait, en sorte qu'il sembloit n'y tenir plus ; cependant lors que je voulus l'oster, je le trouvay encore attaché par un *Pedicule* assez dur, au travers du quel passaient les Vaisseaux Sanguins pour s'aller disperfer dedans & sur l'Oeuf. C'est par ces Vaisseaux que le *Fœtus* reçoit la matiere de son Accroissement & de sa Nourriture, non seulement dans l'Ovaire, mais aussi dans la *Matrice* ; ce *Pedicule* devant servir à former le *Placenta* (si ce n'est pas le *Placenta* luy mesme, desja formé dans l'Ovaire) en s'attachant au corps de la *Matrice* ; c'est aussi par là qu'il faut concevoir que l'*Esprit Seminal* du *Masse* est porté dans le corps du *Fœtus* dans l'Oeuf, pour luy donner le Mouvement & la Fecondité.

Il ne paroissoit encore point de Changement sensible dans la *Matrice*, si ce n'est qu'il y avoit beaucoup de Mucosité, ce qui est assez naturel. La *Trompe* du costé Gauche estoit dans son estat naturel, aussi bien que l'Ovaire, à l'exception de l'Ouverture par où l'Oeuf de l'Enfant precedent estoit sorti.

Explication of
the Figures.

Fig. 60.

Fig. 60. *Matrice* de la Femme. *a a*, Le Corps de la *Matrice*. *b b*, La *Trompe* Dilatée embrassant l'Ovaire. *d c*. L'Oeuf Impregné renfermé dans la *Trompe*. *E*, L'Ovaire Gauche. *F*, Le trou par où l'Oeuf de l'Enfant precedent estoit sorti. *g*, La *Trompe* Gauche. *h*, L'Artere Hypogastrique. *I I*, Les Ligamens Ronds. *K*, L'Oeuf detaché de l'Ovaire. *L*, Le *Pedicule* par lequel il tenoit encore à l'Ovaire.

Fig. 61.

Fig. 61. *Matrice* de la Truie. *a a*, La *Vagina*. *b*, La *Vulve*. *c*, La *Vessie*. *d d d d*, Les Cornes de la *Matrice*. *E E*, Les *Trompes*, ou *Tuba Fallopiana*. *F F*, L'Extremité des *Trompes* Dilatées, embrassant les Ovaires, & pleines de la Liqueur. *g*, Appendix des *Trompes*. *H H*, Les Arteres de l'Uterus. *iii i*, Les Oeufs comme ils sortent de l'Ovaire. *K K*, Une des *Trompes* detachée de partie de l'Ovaire.

A Fœtus formed in the Ovarium ; by M. de S. Maurice. n. 150. p. 285.

CIX. Madam de Saint Mere had been safely brought to Bed eight times; and after having continued five Years without being with Child, about three Months before her Death she suspected herself to be fallen into that Condition again ; because having never failed of being very regular, and not finding herself ill, she was more than a Month without her ordinary Relief. But whilst in this State she had a little Show, which scarce left her wholly during the two last Months of her Life, and which she pass'd never-

vertheless without much Trouble; so that she thought herself to be secure as to the Point of her being with Child. But 22. Apr. 1682, after she was up in the Morning in very good Health, she fell into *Faintings*, which made her lose absolutely her *Pulse* from that Moment, without depriving her of her Understanding or Speech. About Eight o' Clock in the Evening, I came to her: I found her cold, her Countenance deadish, and cover'd with a clammy and cold Sweat, having still an entire Understanding, and her Speech strong. She complained of a great *Colick* in the Region of the Right Groin, which terminated at the Reins: This *Colick* was so violent, that as I was going to touch the Place, she prayed me not to press it, and told me, I should make her fall into a *Swoon*. In a Moment after, she felt all the *Preludiums* of an imminent *Travail*; she called her Chirurgeon, and died in his Arms, saying, *I am delivering, I am delivering*; there appearing outwardly neither Distillation, nor Flooding, nor any Mark of this Disorder.

M. de la Chese was made Choice of to open the Body. As soon as he had opened the *Integuments* of the *Belly*, we saw, in the *Epigastrick* Region, all the Entrails floating in Blood: I caused 2 lb to be taken forth with a Spoon, to avoid changing the Situation of the Parts; after which, seeing that there remained in the Right Flank a prodigious Quantity which was coagulated, I tried myself to take it out with my Hand; and amongst the first Clots which I drew forth, I found a little *Fœtus* about the Bigness of a Thumb, and a 3d less in Length, all very distinctly formed, and in which was manifestly discovered the Sex of a Boy, but naked, and without Covering. Two Fingers from this Place I found the Right *Cornu* of the *Womb*; but was amazed when I found the *Testicle* torn long-ways, and through the Middle on the Side, that it did not touch the *Tuba*, and all its Cavity full of clotted Blood. I no longer doubted, but this was the Place where this Infant was formed; and I conceived, that having acquired in this Place a Growth too great to be able to fall in time, and having continued to grow there without being able to come forth, it had at length broken its Prison by stretching it. I was confirmed in this Opinion, when comparing this *Testicle* with the Left, I found it at least four times bigger, its Greatness approaching that of a Hen's Egg, and the Left being not greater than a little Chesnut; it was all red without and within, besides the clotted Blood that it contained; whereas the Left was pale, and full of little Grains of the Colour and Consistency of yellow Tallow. I examined the *Tube* on the Right Side; and I could not find that this Infant had ever entered there; it was in all things like the Left *Tube*. The *Womb* was every where without any Rent, and in a State purely natural; I only observed, that it was a little bigger and softer than it is found in Women who die without being with Child. It was all, as Dr. Harvey has described it, in the first Month of *Pregnancy*; but when it was first opened, I found not the least Sign of *Conception*. Indeed the Vessels of the Interior Membrane appeared to me full of Blood, and Varicous as it were, which doubtless was the Cause of that little Show of Blood, as before-mentioned.

Authors speak of certain *Fœtus's* found in the *Tubes*; and of others that have been found in the Cavity of the *Belly*, the *Womb* nor the *Tubes* being any

any way torne: but I do not think that any Person hitherto has been able to shew, that the *Conception* is made in the *Testicle* or *Ovarium*, as it seems to me that the Fact which I have now related manifestly demonstrates.

A Fœtus lying
without the Ute-
rus, in the Belly,
by M. Saviard.
p. 222. p. 314.

CX. 1. A Woman big with Child came to *Hôtel-Dieu* to lie-in of her third or fourth Child; and after excessive Pains about the *Navel* and the lower Part of the *Belly* by the different Motions of the Child, she died there, 13. Oct. 1696. She was quickly opened by M. Colignon and Jouey, assisted by the Chief Midwife, Mad. de Glue: They found the Child dead, and not in the *Matrix*, which was whole near it. They deferr'd a farther Search till the next Day, and sent for many Eminent Physicians and Surgeons. We then examined the Body with Attention, and found that all the Parts that compose the *Matrix*, both inward and outward, as also the *Vagina*, were very sound: It was as big as it uses to be in Women ten or twelve Days after they are brought to Bed. The *Internal Orifice* was of a livid Colour, occasioned by the several Touchings of it, both before and after Death. There was no Mark of a Cicatrice or Hole, but those of the Processes called *Tuba Fallopiana*, which yet were hardly wide enough to admitt of a Hog's Bristle. All the Company did agree, that the Child was never conceived in the *Matrix*, and that it never had stay'd there. The Right *Testicle*, or *Ovary*, was very sound; but the *Tuba* and its Fringe were rotten in the Place where 'tis fastened to the Membranes of the *Peritoneum*, which formed the *Bag* in which the Child was wrapt. The Left *Testicle* was of the Bigness of a Hen's Egg, full of a stinking *Serum*, and the Ligaments large; the *Tuba* and its Fringe were rotten. The *Bag* was placed betwixt the *Matrix* and the *Straight Gut*, in the Cavity which is formed by the bending of the *Os Sacrum*: The Child was on his Knees, lying towards the Right-Side, and seemed to have been dead seven or eight Days; for the Scarf-Skin, or *Epidermis*, did easily separate from the Parts under it. The Child had left its *Placenta*, though still fastened to it by the *Umbilical Vessels*; and the *Placenta* being out of the *Bag*, was on the Left Side, whence was voided a great Quantity of Blood into the Capacity. Its Edges being brought near to one another, represented a Bowl, such as they play at Nine-pins with. All the Membranes that formed this *Bag*, and those that encompassed it, were gangrened.

I believe that the Bigness which we observed in the *Matrix* proceeded only from the Reflux of Blood, and the Spirits which carried the Nourishment to the *Fœtus* when it lived.

By Dr. Fern.
p. 251. p. 221.

2. A Goldsmith's Wife, near 9 Months gone with her fifth Child, was received into the *Hôtel-Dieu*, 29. Sept. 1696. She was then about 34 Years of Age, of a tender Constitution, had had 4 Children before, all which had done very well; but with the present she had been very ill, and endured a great deal of Misery. The Midwife who examined her Body, found a considerable Rising on the Right Side near the *Navel*, which very much resembled a Child's Head, her *Belly* below that Place bearing no Proportion to that above, or to the time of her *Pregnancy*: On the Left Side there was nothing singular. The Midwife thought she felt, through the *Vagina*, a
thick

thick Membrane, filled and distended with Water, and in it the Heel of a Child bent towards the Thigh; but she could not be assured whether this was within the *Womb* or not, by reason the *Inner Orifice* was drawn so high under the *Os Pubis*, she could not, without some Difficulty, touch it with the Extremity of her Finger. Upon trying some time after, she could not discern any thing like the *Fœtus* she had before felt. The Patient told her, that for the first six Weeks after her being with Child, she had great and continual Pains, which shot towards the *Navel*, and terminated there; and these lasted till the third Month; that from thence to the sixth, she had frequent *Convulsive Apoplectick Fitts*, and terrible *Synopes*, so that those about her despaired of her Life; that from the sixth to the eighth Month, she had enjoyed a much better Health, which in some measure had strengthened both her and her Infant; that the Pains she had endured since that time seemed to be so many alternate *Throws*, (probably proceeding from the repeated Stroaks of the Child's Head in that Place, where the *Teguments* were so thin, by reason of their great Extension, that the Hardness of the *Cranium* could plainly be discerned through them.) In this Condition was this miserable Woman when she was received into that *Hospital*, till her Affliction increasing, she could not lie on her Side or Back, being forced to sit in a Chair, or kneel in her Bed, with her Head resting on her Breast. These strange and unaccountable Symptoms obliged the Midwife to consult with the Physician and Master Surgeon of the House, who thought it was best to leave the Work to Nature, and prepare the Woman for her Labour, by opening a Vein in her Foot. The Evacuation was ordered to be small (in which Regard was had to the Weakness of the Patient, and the Nicety of her Constitution.) However, after this time the Child made no Efforts, and the Tumor subsided, there remaining only an *Hydropick* Indisposition, which might be perceived by the Fluctuation; and a great Quantity of Water came away for several Days, from the *Orifice* of the Vein; insomuch that she who seemed to have her lower Belly and Thighs extremely distended, was very much extenuated before her Death.

After her Decease, her Body was opened by M. Joney: And upon the first Incision through the *Teguments*, there came away two or three Pints [of Paris Measure] of Water and Blood, and there appear'd the Head of a Child naked; and when the Parts were all laid open, there was found an entire Female *Fœtus*, contained in a sort of Cover or Bag, which at once served it both for a *Womb* and Membranes. M. Joney took the Child with the *Umbilical String* out of the Mother's Belly, tracing the *String* to the *Placenta*, into which it was inserted. This last appeared like a great round Lump of Flesh, and adhered so firmly to the *Mesentery* and *Colon* on the Left-Side, that it could not be separated from them without some Trouble. On one side of this Lump was a lesser, about the Size of a *Kidney*, which principally adhered to the *Mesentery*, and received several Branches of the *String* into it. The larger Lump was round, and the greatest Part of it adhered to the *Bag* or *Cafe* which contain'd the Child. This *Cafe* or *Bag* was corrupted and mortified in Part, which probably might proceed from the frequent Stroaks of the Infant's Head. It sprang

sprang from the Edges of the *Tube*, or *Fimbria* of the Right *Ovary*, which was more entire than the Left, and proceeded obliquely to the Left Side, terminating at the Bottom of the *Pelvis*. In its Descent, it sent out a small Portion between the *Womb* and the *Rectum*. This *Bag*, by compressing the neighbouring Parts, had gained a considerable Space in the above-mentioned Cavity; in such manner, that a great Part of the *Child's* Body was lodged at the Bottom of it, in a bended Posture, with the Head projecting forwards, which formed the Prominence near the *Navel*. This *Bag* seemed to be nothing else than an Elongation and Distention of the *Tube*, and an Expansion or Production of the *Broad Ligament* on the Right Side, which was evident from its Continuity to those Parts, and the Distribution of the *Spermatick Vessels*, which were larger than usual, and passed from the Extremity of the *Tube* to the larger Lump. The *Womb* was entire, and in its natural State, except that it was something larger than ordinary, being about the Size of that of a Woman ten or twelve Days after her *Delivery*, and no Marks that the *Child* had been lodged in it.

M. *Jouey*, having observed this, thought fit to desist till several Eminent Physicians and Surgeons were called, and then the *Womb* being carefully dissected, it was unanimously agreed that the *Fœtus* had never been in it, [it being, as it was noted above, in the same State as in Women who are not with Child, except the small Dilatation of its Bulk, which might arise from a Compression of the Vessels, and Interception of the reflux Blood, by the unnatural Position of the *Fœtus*.] In thrusting a long and slender Probe through the Right *Horn* of the *Womb*, it easily passed into the *Tube* of the same Side for three Fingers Breadth in Length; but it could not be thrust farther, by reason of the Constriction of the *Tube* in that Part. The Capacity of the *Tube* could not be distinguished, the *Parietes* of it, by their Coalition with the *Chorion* and *Amnios* of the *Child*, forming the *Bag* in which the *Child* was included, which extended from the *Tube* on the Right Side to that on the Left, and was agglutinated to the *Viscera* of the Lower *Belly*, the *Rectum*, and to the Back Part of the *Womb*, as appeared by some Fragments remaining on those Parts after the Separation.

A Fœtus in
the Right Horn
of the Uterus;
by Dr. Fern. n.
251. p. 125.

CXI. In dissecting the Body of a Woman, who supposed herself to be three Months gone with Child, I found the *Womb* very small, not larger than in Virgins, and a hard Substance in the Right *Horn*, which being opened, appeared to be the *Skeleton* of an *Infant*, with the *Navel-String* smeared round with a white Matter not unlike *Plaster*.

A Woman with
Child, notwith-
standing a Co-
alescence of the
Vagina Uteri;
by.....
n. 237. p. 56.

CXII. Ad *Fœminam* in *Puerperio* enitentem, ante aliquot *Septimanas* accensus eram, quæ *Parturiens* *Doloribus* per biduum laboraverat; absque ullo tamen effectu, nam ne *Guttula* quidem *Sanguinis* aut *Aquæ* adhuc effluerat. Nec mirum; *Vagina* enim *Uteri* (paulo supra *Ductum Urinæ*) firmiter Coaluerat, & latera ejus tam arctè unita erant, ac si semper unica essent *Membrana* non prius perforata. Ab ejus *Marito* interrogabam quam diu *Vulva* tam *Clausula* esset: respondit, per *Quinquennium*; viz. à tempore prioris

prioris *Puerperii*, quo in difficili Partu huic obstetricaveram. Quod *Coalescentia* tam arcta erat, non *Tactu* solum, sed *Visu* deprehendi. Post integram fere diem, multos fortisque Enixus, una cum auxilio manus Obstetricis, aliquantulum Aperta (& ni fallor Lacerata) erat Membrana; adeo ut *Digito* minori daretur *Ingressus*: hanc Apertionem (ut ad Partum conduceret) per *Speculum Matricis* Dilatare visum est; hoc facto magna *Hæmorrhagia* statim sequebatur, unde infelix *Fœmina* ita debilitata erat, ut 6 vel 7 horis à Partu *Infantis* mortuæ expiravit.

In animo etiam atque etiam volutanti, quomodo fieri posset ut in *Utero* conciperet hæc *Mulier*, ad quem *Membrum Semenve Virile* nunquam accederat, mihi in *Mentem* venit *Opinio* doctissimi *Harvæi* nostri in *Libro de Generatione* divulgata, (cui ob hanc demonstrationem assentire cogor) viz. quod *Fœtus* non formatur ex *Semine Masculino* in *Uterum* ejecto, sed tota *Massa Sanguinis* (quasi per *Contagium*) vim *Plasticam* à *Semine Virili* accipiens *Ovis Uterinis* communicat, unde fiunt fertilia: & eo magis cum illo sentio, quoniam scio hanc *Fœminam* *Infantulum* vehementer appetuisse, unde proculdubio eo majori desiderio cum viro rem habuit; & maxime probabile videtur, quod inflatis *Muliebribus* instante coitus, *Spiritus* eo tunc temporis affatim affluentes *Effluvia* aliquot à *Semine Virili* attraxerunt, *Sanguinisque Massæ* & deinceps *Ovis Uterinis* *Fœcunditatem* communicarunt.

Nota, Quod non obstante hac *Clausura*, frequenter per *Menses* purgata erat, antequam *Utero* concepit.

CXIII. 1. *Margaret Mathew*, Wife of *John Puget*, Shearman, (at or near *Toulouse*) being with Child in 1652, perceived, about the end of the ninth Month of her Bearing, such Pains as Women usually have, when about to fall in Labour. Her Waters also broke; but no Child followed. For the Space of 20 Years, she perceived this Child to stir; with many troublesome Symptoms accompanying: But for the six last Years, she perceived not the Child to move. She died June 18, 1678; and the next Day, being opened, a dead Child was found in her Belly, out of the Womb, no way joined or fastened to it; the Head downward, the Buttocks hanging toward the Left Side. All the Back Part of this Child was covered with the Omentum, which was about two Fingers thick, and stuck hard to divers Parts of the Body of it, not to be separated without a Knife; which being done, very little Blood issued. This Infant weighed eight Pounds Avoirdupois. The Skull was broken into several Pieces: The Brain of the Colour and Consistence of Ointment of Roses: The Flesh red, where the Omentum stuck; other Parts whitish, yellowish, and somewhat livid; except the Tongue, which had the natural Softness and Colour. All the inward Parts were discoloured with a Blackishness, except the Heart, which was red; and without any issuing Blood. The Forehead, Ears, Eyes, and Nose, were covered with a callous Substance, as thick as the Breadth of a Finger. The Gums being cut, the Teeth appeared in the Adultness of those in grown Persons. The Body had no bad Smell, though kept 3 Days out of

A Child 26 Years in the Mother's Belly, out of the Uterus; by Dr. Bayle. n. 139. p. 979.

of the Mother's Belly. The Length of the Body, from the Buttocks to the Top of the Head, about 11 Inches. The Mother died about the 64th Year of her Age.

By . . . n. 140.
P. 1001.
Vid. Sect. CIV.

2. This History of the *Fœtus*, and that of an *Hydropick Testicle*, (mentioned above) may be two Arguments farther to satisfy those who have hitherto doubted of the *Female Testicle* its being an *Ovary*; the former proving the *Vesicles* thereof, with the Humour or Humours they contain, to be the *Eggs* out of which the *Fœtus* is bred: Which as they are used to enter into the *Womb* by the *Fallopian Tube*; so in this Case it is most likely, that the *Egg* falling off the *Ovary* into the said *Tube* by some preternatural Contraction of its lower Orifice, was stopp'd from issuing thence into the *Womb*. Yet being, it seems, near enough to receive the *Vital Contact*, it thereupon began to be enlarged; and so, by reason of its own increasing Bulk, was made gradually to slip back again towards the upper and larger Orifice of the said *Tube*, and at last to drop thence into the *Cavity* of the *Abdomen*; which now, instead of the *Womb*, became its *Nest*. The latter sheweth, that it is possible for the said *Vesicles* or *Eggs* to be enlarged upon Conception, as much as is necessary for the Generation of a Child: That is to say, when within the *Womb*, as much as they were in that Case upon the *Ovary*. So that it is not, I conceive, reasonable to be doubted, but the Membranes, which we call the *Secundine* or *After-birth*, are the individual ones which belong to that *Vesicle* or *Egg* which falls from the *Ovary* into the *Womb*; being therein, with their contained Humour, Naturally augmented and amplified, as there they were Preternaturally, in that *Hydropical* Case.

The Bones of a
Fœtus voided
per Anum, some
Years after Con-
ception; by Dr.
Ch. Mosley. n.
227. p. 486.

CXIV. De Præternaturali hac *Fœtus* Excretionē, 40 penè Annorum Interventu à nobis remota, rem totam, prout ab ipsius Puerperæ Amicis & Familiaribus relata mihi erat, sic accipe. Mulier quædam plebeia, sed non inconcinna, Nomine *Maria Kid*, 30 circiter Annos nata, *Fœtus* antea enixa, habitans in pago dicto *Swasy*, &c. circa Annum 1658. imprægnata, cœpit *Utero* ingravescere. Per totum *Gravidationis* decursum ordinaria Symptomata, suo quaque tempore, se ostendebat; Obstetricem tandem accersit, & expectatos *Parturientium* Dolores passa est: Quod cum post aliquot dies nihil promoveri sentiret, & remittente *Dolore* omni, superesset tamen *Abdominis* Tumor; admirabunda Animi, ad usitata tamen munia sese confort; Excurrit alter Annus integer, at illa à *Ventris Onere* neutiquam liberata est; excurrit & semialter, manent miseriæ. Attonita itaque Mulier Morbum suum extraordinarium extraordinario Remedio tentat abigere: Erat enim tunc temporis in Oppido *Stri. Iovnis* Rusticus quidam & Absurdus planè Sordidusque homo, qui cum Filius esset Natus Septimus, proprietate Nascendi consecratus est in Morborum Terriculamentum. Hic Vir itaque, sive Arcanum hocce Medicum, cum ad Miseram accerferetur, non ingrato quopiam Medicamine, sed mera loci Affecti atrectatione, opitulaturum se pollicetur. Credidit *Ægra*, (tantum Religio potuit suadere,) convocatis itaque vicinis Mulierculis, discessitque circa utrumque *Hypochondrium* canisiam

camifiâ, *Ventrem* suum ambabus *Manibus* demulcendum *Ægra* præbuit: Ista vero *Uteri* quasi *Benedictione* finitâ, *Cystim* ligneam parare iussa est, & quicquid *Utero* exiret in ea recondere. Nulla mora, in præsto stat *Arca*; post duas circiter *Hebdomadas* *Ossiculum* non per *Uterinas* vias, sed per *Anum* rejicitur, & per aliquot temporis intervalla alia permulta excernuntur; quamdiu enim ultra statutos *Gravidationis* terminos *Utero* intumuerat *Mulier*, tantundem plane temporis in dejiendis istis *Sedibus* *Osseis* emensa est. In *Arca* omnia religiosissime reponuntur *Ossa*, quorum tantus erat numerus, tot distinctæ apparebant *Calvarie*, ut tres *Fætus* in *Utero* *Materno* tam diu intumulatos jacuisse omnes existimarent. Ipsam vero *Matrem*, post tam diuturnas *Cadaverosi* *Partûs* ærumnas, incolumem tamen præstitit *visæ* *insede*, & quem prius *Abscessum* pro *Fætus* exitu molita erat, eadem jam refarcivit, & sic quæ prius *Obstetricis*, jam *Medici* partes agebat. At tantis *Beneficiis* frui nescivit inconsulta *Mulieris* temeritas, post duos enim *Annos*, cum ad *Nundinas* *Sturbrigenses* prope *Cantabrigiam* habitas, *Equo* *Succussore* veheretur, recrudescente, ob *Motus* violentiam *Ulcere*, extincta est.

CXV. A Negro-Woman, belonging to Capt. Mead in *Nevis*, about the 17th Month of her being with Child, was reliev'd after this manner. Her *Navel* impostumated and broke of itself, and after it had voided some Quantity of *Ichorous* Matter, whereby she had some Ease, it left off. In about a Month more, it impostumated again to a far greater degree than before; whereupon the Chirurgeon being sent for, he, where it did seem most jetting out, which was the *Navel* itself, did lay it open with a large Lancet; and then, after voiding a great deal of thin *Ichor* and Matter, there appear'd some *Bones*, which proved to be a *Child*, that the *Flesh* was decay'd from, the which did stink much. But after the *Extraction* of the *Bones*, the Woman recover'd: And I was told by the Chirurgeon, and several others, that she had a *Child* since.

A Fætus void-
ed at an ulcered
Navel; by Mr.
James Brodie.
n. 229. p. 580.

CXVI. Margaret Parry, of *Hintbery* in *Berkshire*, in the Year 1668, was deliver'd of a *Child*; she continu'd indifferently well 2 or 3 Days after her *Delivery*; then new Pains came upon her, and for 3 Weeks together there came from her daily some Quantity of Corruption, with Pieces of *Flesh* and *Skin*; and she continu'd dangerously ill for about 8 Weeks; at the end of which time she was reliev'd. After 2 Years, she began to breed again, had 3 Children in the 3 Years following; all which were drawn from her by *Violence*. During her *Lying-in* with the last of these 3 Children, some *Bones* of a *Fætus* came from her; after this, several other *Bones* came away with her *Catamenia*, and several (amongst which were divers Parts of the *Skull*, and some of the larger *Bones* of the Body of a *Fætus*) work'd their Way by degrees through the *Flesh* above the *Os Pubis*.

The Bones of a
Fætus voided a-
bove the Os Pu-
bis; by ———
n. 243. p. 292.

The Woman was alive and in Health in Oct. 1684. All the Children were born perfect.

A false Conception, by Dr. Will. Cole. n. 172. p. 1045.

CXVII. Matrona quædam, Mente omnino constans, pia, fide dignissima, & circa Prægnantes & Puerperas olim versatissima, Septuagesimum nonum Annum nunc agens, [*An. sc. 1673.*] se *Fætum Utero* gestare jamdiu credidit, creditque adhuc, imo quod magis mirabere (forlan & risu excipies) per totos septem elapsos annos gestasse. Dum illac Negotiorum causa Quadriennio abhinc iter facerem, & à quibusdam, ipsa non minus credulis, rei famam acceperam, Novitate permotus ad hoc Miraculum nulla mora contendi: Inveni Ventrem multum Tumentem, non autem, qualis esse solet *Hydropicorum* Tumor, apparuit, sed sursum, more *Gravidarum*, eminebat. Et dum plura sciscitarer, nec illam (ut nec ejus Maritum, qui decennio minor uxore fuit) de *Ingravitatione* amplius dubitantem comperissem, petii ut tantæ Fiduciæ causam exponeret. Illa haud gravate respondit, se olim 10 liberos enixam, nec ab eo tempore per 28 annorum spatium Mensium Fluxum passam, in eum tandem satis copiosum incidisse, ex quo brevi post omnia *Conceptus* signa apparuerunt; inde nauseam, & Vomitiones subinde recurrentes, nec non & Inordinatam quorundam præ cæteris ciborum Appetentiam, ut *Prægnantium* mos est, invasisse, & per plures Menses perstitisse, Ventre paulatim *Intumescere*; postea solito tempore primos *Fætus Motus* se percipisse, & exinde, Tumore indies aucto, *Motus* etiam tanquam ejusdem locum sæpe variantes, nunc ab una nunc ab altera Ventris parte, qui & tractu temporis invalescebant, sensisse; tandem (appellente usitato *Partus* tempore) ipsos *Parturientis* Labores subiisse, ut Obstetricem accersere necesse habuerit. Sed non adfuit *Lucina*: attamen licet Dolores illi evanuerint, haud *detumuit* Venter; quin sæpius præ Dolorum recurso Obstetrix (quæ & ipsa, prout à nonnullis accepi, in eandem cum Domina sua Sententiam propenderat) rursus accita est. Ab eo tempore *Motum* illum, sed vegetiorem persensisse asseruit, adeo ut Vestes frequenter attolli ab Adstantibus conspectæ fuerint, Tumore, licet aliquantulum, haud tamen impense, aucto. *Mammae*, quas & vidi & attrectavi, minime, prout Vetulis solenne est, flaccidæ, sed amplæ & distentæ (at non supra modum) Glandulisque, more *Prægnantium*, distinctæ. Mihi quin etiam sponte affirmavit, Obstetricem sibi asseruisse *Orificium uteri Internum* æque tenerum & molle fuisse, ac in quavis Fœmina mox *paritura*. Cum porro percontarer utrum inter decumbendum, cum à Latere ad Latus se reclinaret, Pondus ab uno in alterum devolvi perciperet, prorsus negavit, meque de *Mola* nil suspicari jussit, cum illam peritius dignosceret, quam ut hac in parte decipi posset.

Cis paucos dies illam revisi, eademque, ut retuli, denuo narrantem audi- vi, *Mammæ*que in eodem statu comperi, *Ventrem* vero aliquanto magis *intumuisse*, de cujus Tensione plurimum conquesta est. *Motus* autem magis, quam antehac, vegetos se tum percipere dixit: atque ego manu supra Vestes admotæ, bis, dum pauculam illic moram facerem, ejusmodi *motum* nunc ex una nunc altera ventris parte sensi, quale in verè *Prægnantibus* observasse memini. Toto hoc *Gestationis* (si ad ipsius mentem loqui liceat) tempore nullum, saltem alicujus Momenti, sanitatis Dispendium passam se profitetur, nullis Symptomatibus laborasse, nisi quæ *Gravidis* sunt familiaria,

& quæ etiam dum *Puerpera* fuit, perpeti solebat. Cibos satis recte appetit, optimeque digerit: minime *Siticolosa* est, prout *Hydropicis* usui est, Urinamque ad Liquidorum assumptorum *Mensuram* proportionatam reddit, ad morem autem *Gravidarum* solito frequentius. *Ædes Hortumque* satis valenter obambulat, nec *Bacculi* fulcimento indiget. Moderate dormit, sed *petulcâ Ventris Sarcina* Matri suæ vix ultra *Diluculum* quietem indulget, verum *Calcitratu* cogit è lecto surgere; quo facto, & Cibis assumptis, illa se iterum Somno parat, saltem mitius sævit. Quoad *Habitu* corporis, Carnosa est, Vultusque nihil morbidus (me *Judice*) intus latentis præ se fert. Nullum *Tibiarum Pedumve* toto decursu unquam passa est Tumorem, nec vulgatum ullum *Hydropis* cujuscunque, sive universalis, sive ipsius *Uteri* Indicum, præter Solum, quem dixi, *Abdominis Tumorem* colligere potui. Nec tamen *Fætum* Utero includi quisquam, nisi qui *Famæ suæ* prodigus est, asseruerit, cum & *Ætas*, & *Temporis à prima affectus Invasione* decursu longitudo, in tam absonam *Sententiam* insurgant.

CXVIII. 1. The Wife of one *Taylor*, a *Taylor* in *Heywood* in *Staffordshire*, about 24 or 25 Years of Age, being married about a Year, in *Jan.* 1683. fell into *Travail*, and after 5 or 6 Days, the Child being dead, was brought away with fit Instruments: And when Mr. *Birch's* Wife had also brought away the *After-Birth*, she perceived something still remaining; which so firmly adhered to the Womb, that it was very difficult and painful to separate it, and occasioned a large Flux of Blood.

A Preternatural Conception in Staffordshire; by Mr. Sampson Birch. n. 150. p. 281.

It is farther observable, that the *Child* was perfectly formed; that the Mother recovered; that before Marriage, she was never troubled with any remarkable Distempers; and that this *Monstrous Substance* was not observed to be included in any *Cystis*, the *Secundine* being all brought away before it.

2. I have had an Opportunity of observing this *Preternatural Body*, and of discoursing Mr. *Birch* himself. Its *Shape* may be easily conceived by the *Figure*. In the uppermost Part thereof was a round protuberant Bone, $3\frac{1}{2}$ Inches in Compass, covered with a thick fleshy Skin, beset with short Hairs. In the Top of this Bone, in a Circle, were placed 8 *Dentes Molares*, which so exactly resembled *Teeth* as to their Shape, Whiteness, Hardness, and in all other Circumstances, that they can certainly be nothing else. 1. A little below this, in another Bone, (which yet was fastened to the former) were placed 5 other *Dentes Molares*, 4 of which made almost a straight Line, but some Distance in the Middle, and the 5th was a little out of Rank, being placed below the two uppermost. The remaining Part composed a large *Cystis* or Bag, fill'd with a liquid slimy Matter, but not fœtid. This *Cystis* on the outside was smooth, appeared somewhat Red, and was about the Thickness of the *Scrotum*.

By Dr. Edw. Tyson. ib. p. 282.

Fig. 62.

A little below the Bone, (in which were set the 8 *Teeth* before described) we observed a large Lock of Hair, of a bright Brown Colour, whose End was intricated and entangled in a large Quantity of Hair, of a more faded and yellowish Colour, which was fastened to the End of the *Cystis* opposite to

to these *Teeth*. But that this Lock of *Hair* was of a considerable Length, we easily guessed by the several small Curis we observed in the yellowish *Hair*, which were of the same bright Colour with the former Lock. In the middle of the Circle of the eight *Teeth*, I observ'd a small Hole, but which did not lead far.

Vid. sup. Cap. I.
Set. X. 4. H.

What most I can parallel this *Monstrous Body* with, are those Instances of *Teeth*, *Bones* and *Hair*, met with in the *Ovaria* of Women, by Dr. Sampson and myself. But our present Instance differs from them, in that this was in the *Womb*, and firmly adhering to it; the others in the *Ovarium*. In this, the *Hair* was on the Outside of the *Cystis*, and rooted in its Tunicle; in the others, 'twas contain'd within it. But as the *Child*, which was perfectly form'd, and with much Difficulty at last brought from this Woman, I doubt not, at first, being included in the *Egg*, descended from the *Ovarium*; so likewise this *Subventaneous Egg*, I question not, might be transmitted from the same Place; and Nature, which is never idle, being disappointed of forming in this a perfect *Fœtus*, made the best of what the Matter would afford, and might produce these *Teeth*, *Bones* and *Hair*, which may be reckoned as *Animal Vegetables*.

Extraordina-
ry Effects of
Strength of Ima-
gination; by Dr.
S. Geo. Ash, Bp.
of Cloyne. n.
228. p. 334. n.
243. p. 293.

CXIX. 1. One *Eliz. Dooly*, of the County of *Kilkenny*, was aged thirteen Years in *Jan. 1687*. Her Mother being with Child of her, was frighted by a Cow, as she milked it, thrown down, and hit on her Left Temple, within an Eighth of an Inch from her Eye, by the Cow's Teat. This Child has exactly in that Place a Piece of Flesh resembling a Cow's Teat, about three Inches and a half in Length: 'Tis very red, has a Bone in the midst about half the Length of it; 'tis perforated, and she weeps through it: When she laughs, it wrinkles up, and contracts to two Thirds of its Length; and it grows in Proportion to the rest of her Body. She is there as sensible as in any other Part.

By Dr. Cypri-
anus. n. 221. p.
291.

2. A Lady was lately delivered of a Girl, with a *Wound* in her Breast above four Fingers long; which obliquely from the Top downwards, from the *Sternum* to the Left Side, stretched itself over the whole Breast. I found that the *Wound* penetrated to the *Musculi Intercostales*, and that it was at least an Inch broad, hollow under the Flesh round about the *Wound*: Besides that, there was a *Contusion*, with a little Swelling, (red and blue, as is used to be in *Contusions*) at the lower Part of the *Wound* in the Inside. The Child came into the World without any Force, and consequently it got not this *Wound* in its Birth; but it was occasioned by Strength of *Imagination*: For about two Months before, the Mother was gone to Bed, and by Chance she heard a Report that a Man had murder'd his Wife, and with a Knife had given her a great *Wound* in her Breast; at which Relation she changed, but not excessively.

Now my Opinion is, that the Child, at that very Moment that the Mother was frighted, received the *Wound* in its Mother's Body, because that the *Wound* was very fordid; and the Inside, as well as the Outside, beset with Slime, proceeding from the Water wherein the Child is
used

used to lie in its Mother's Womb, and also very like a *Wound* received long since. But after three or four Days dressing the *Wound*, beginning to come to *Suppuration* and *Mundification*, began to bleed very fast, with Streams when dressed and wiped; and it plainly, in all its Circumstances, was very like a fresh cut *Wound*, and being simply handled as such, it healed up. The *Contusion* also, whilst that the *Wound* was healing, began to come to *Suppuration*, and made a Gathering, and drew down the Matter and Blood towards the Back; for the Situation of the Child was such, that the Matter could not ascend to the Wound, out of which Swelling, when it was opened, Matter and Blood ran, in the same Manner we used to see in a *Contusion* made some Days. So that I judged this *Wound* wholly, even at the Birth of the Child, in that State (as I suppose it was) at that very Moment when the Mother was terrify'd, except that it was covered with Slime, as above-said. And I suppose that this Accident remained so long in the same Condition, because no Air could come to it, and the Child lay all over in Water, which has a preserving Vertue, insomuch that it excludes the Air.

CXX. *Papers (of less General Use) omitted.*

1. The Structure of the *Epiploon*; extracted from the *Tetras Anatomiarum Epistolarum Marcelli Malpighii, & Caroli Fracassari de Lingua & Cerebro.* n. 29. p. 552.
2. Experiments relating to the *Stone*, and its Cure; proposed by Dr *Fred. Slare.* n. 157. p. 533.
3. Some late Observations by Dr. *Kerckringius*, concerning *Eggs* to be found in all sorts of *Females*; extracted from his *Anthropogenia Ichnographia*; with some Reflexions thereon, by M. *Denys.* n. 81. p. 4018.

CXX. *Accounts of Books omitted.*

1. *Caspari Bartholini, Thomæ Filii, Diaphragmatis Structura nova; una cum Methodo præparandi Viscera.* Paris, 1676. in 8vo. n. 130. p. 768.
2. *De Viscerum Structura; Exercitatio Anatomica Marcelli Malpighii.* Bononiæ, 1666. in 4to. n. 44. p. 888.
3. *Dissertatio Anatomico-Medica, de Motu Bilis Circulari, ejusque Morbis,* quam publice olim habuit *Mauritius Van Reverhorst.* in 8vo. n. 164. p. 619.
4. *Regn. de Graaf, de Succo Pancreatico; Exercitatio Anatomico-Medica.* Lugd. Bat. 1671. in 12mo. n. 10. p. 178. n. 79. p. 3066.
5. *De Secretione Animalis Cogitata; Auth. Guil. Cole, M. D. Oxon.* 1674. in 12mo. n. 106. p. 134.
6. *Traité du Cancer; où l'on explique sa Nature, & où l'on propose les moyens les plus sûres pour le guérir methodiquement. Avec un Examen du Systeme & de la Pratique de Mr. Helvetius; par M. I. B. Alliot.* Paris, 1698. in 8vo. n. 240. p. 193.
7. *Recherches sur la Nature & la Guérison des Cancors; par M. Deshayes.* Geudron, M. D. A Paris, 1700. in 8vo. n. 260. p. 479.

8. *Tracta-*

- n. 128. p. 705. 8. *Tractatus de Ventriculo & Intestinis*; cui præmittitur alius de *Partibus Continemibus* in genere, & in specie de *Partibus Abdominis*; Auth. *Franc. Glissonio*, M. D. Lond. 1676. in 4to.
- n. 177. p. 1246. 9. *J. Con. Peyerii Merycologia*; sive de *Ruminantibus & Ruminatione* Commentarius. *Basil.* in 4to.
- n. 163. p. 566. 10. *Petri Chirac. Dissertatio Academica*; an *Passioni Iliacæ Globuli Plumbei Hydrargyro præferendi*? *Monsp.* 1694. in 12mo.
- ib. p. 570. 11. *Christiani à Steenvelt Dissertatio de Ulcere Verminoso.* *Lugd. Bat.* 1697. in 4to.
- ib. p. 571. 12. *Godefr. Bidloo Observatio*, de *Animalculis* in *Ovino* aliorumque *Animalium Hepate* detectis. *Lugd. Bat.* 1698. in 4to.
- n. 54. p. 1089. 13. *Nath. Highmori*, de *Hysterica*, & *Hypochondriacæ Passione*, *Responsio Epistolaris* ad *D. Willis.* *Lond.* 1670. in 4to.
- n. 57. p. 1178. 14. *Affectionum quæ dicuntur Hysterica & Hypochondriacæ Pathologia Spasmodica Vindicata*, contra *Responsion. Epistol. Nathanaelis Highmori*, M. D. Cui accessere *Exercitatio Medico-Physicæ duæ*; 1. De *Sanguinis Accensione*; 2. De *Motu Musculari.* Auth. *Tho. Willis.* M. D. *Lond.* 1676. in 4to.
- n. 850. p. 309. 15. *Tractatus de Podagra & Hydrope*; per *Tho. Sydenham*, M. D. *Lond.* 1683.
- n. 107. p. 164. 16. *La Lettre de Charles Drelincourt à M. Porrée*, sur la *Methode*, pretendue *Nouvelle*, de *Tailler la Pierre*: Avec tres autres à *M. Vallot.* A *Leide*, 1674. in 12mo.
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CHAP. V.

The Humours, and general Affections of the Body.

I. **I**N the Beginning of the Year 1683, I first discovered the *Visible Circulation of the Blood in the Water-Newt*; which, I perceive, *Dr. Garden* has since hit upon, and mentions in a Letter to *Dr. Middleton*, July 17. 1685. I frequently shew'd it, both on the Outside without Dissection, and in the inward Vessels, to several curious Philosophers; particularly May 26, 1684, I opened (before our Society at *Dublin*) a *Water-Newt*, which I take to be the *Salamandra*, or *Lacerta Aquatica*: In the Body of this Animal there are two long *Sacculi Aerei*, in which the *Blood-Vessels* are curiously ramified. To these *Blood-Vessels* applying a *Microscope*, I shew'd the *Circulation of the Blood, ad Oculum*, as plainly as Water running in a River, and more rapidly than any common Stream. The same Experiment I repeated again before them on the 2d of *June* following; and to those that had good observing Eyes, the *Circulation* was as *visible* outwardly on the Hands and Toes, as in the Vessels within. But certainly the Appearance in the Vessels on the two fore-mentioned *Sacculi*, with the beating, emptying, and filling of the Heart, is most surprizing.

The Visible Circulation of the Blood; by Mr. Will. Molyneux. n. 177. p. 1236.

II. In a Sheep, weighing alive 118 lb, we found $5\frac{1}{4}$ lb of *Blood*, which is less than $\frac{1}{3}$ Part of the Weight of the Sheep. In a Lamb, weighing $30\frac{1}{2}$ lb, when living, there was but $1\frac{1}{2}$ lb of *Blood*; which is nearly $\frac{1}{3}$ Part. In a Duck, weighing alive 2 lb 14 Ounces, 50 Gr. we found an Ounce and a Half and 53 Gr. of *Blood*; which is less than $\frac{1}{3}$ Part. In a Rabbet, weighing 10 Ounces, 7 Dr. and 50 Gr. we found 2 Dr. 57 Gr. of *Blood*; which is about $\frac{1}{3}$ Part.

The Quantity of Blood in Men, and the Celerity of its Circulation; by Dr. Allen Moulton. n. 191. p. 433.

In the Right *Ventricle* and *Auricle* of the Heart of a Dog, I found 6 Ounces of *Blood*; after that I had injected into the *Jugular Vein* a Liquor that

coagulated the *Blood*. I found a greater Quantity of *Blood* in the *Heart* of another Dog, whom I treated after the same manner. The *Hearts* were much distended by the *Blood* found in them. I shall therefore suppose that 4 Ounces only were received at a time by these *Hearts* without Force, that is, naturally. But I shall suppose a *Man's Heart*, (tho' much larger, and has much larger Vessels than those I speak of) to receive but 4 Ounces at each *Diaſtole*; and then allowing 75 Pulses to every Minute, there will be 4500 in an Hour, and 18000 Ounces of *Blood* transmitted in that time.

Now if we shall suppose that a *Man's Blood* bears the same Proportion to his Weight, as that of any of the aforesaid Animals had to its Weight, which in a Lamb was the greatest, being $\frac{1}{3}$ Part, it will follow, that the Quantity of *Circulating Blood* in a *Man* weighing 160 lb, will not exceed 8 lb; or 128 Ounces; according to which Computation, the *Blood* will circulate 140 times in an Hour. But let us suppose, that instead of 8 lb, the Mass of *Blood* in such a *Man* be 12 lb, it will follow, that it will circulate between 93 and 94 times in an Hour. From this Celerity of the Circulation of the *Blood*, we may give an Account of a sudden *Refecſion* with *Viſuals*, and particularly such as are liquid: We may also account for the quick passing of *Urine* from the same thing; and also the quick Motion of the *Chyle* into the *Breasts* of *Nurses*; without supposing unknown Passages from the *Stomach* or any other Part into the *Bladder* and *Breasts*.

Anatomists commonly suppose no more than Half an Ounce of *Blood* to get into the *Heart* at one *Diaſtole*; and the whole Quantity of *Blood* in the *Body* to be between 15 and 25 lb; by which it may appear how their Computations and mine differ.

A Method of
transfusing
Blood, by Dr.
Lower. n. 19. p.
352. n. 20. p.
373.

III. 1. First, take up the *Carotidal Artery* of the Dog or other Animal, whose *Blood* is to be transfused into another of the same or a different Kind, and separate it from the *Nerve* of the 8th Pair, and lay it bare above an Inch. Then make a strong Ligature on the upper Part of the *Artery*, not to be untied again; but an Inch below, viz. towards the *Heart*, make another Ligature of a running Knot, which may be loosened or fastened as there shall be Occasion. Having made these two Knots, draw two Threads under the *Artery* between the two Ligatures; and then open the *Artery*, and put in a Quill, and tie the *Artery* upon the Quill very fast by those two Threads, and stop the Quill with a Stick. After this, make bare the *Jugular Vein* in the other Dog about an Inch and a half long; and at each End make a Ligature with a running Knot; and in the Space betwixt the two running Knots, draw under the *Vein* two Threads, as in the other: Then make an Incision in the *Vein*, and put into it two Quills, one into the *Descendent* Part of the *Vein*, to receive the *Blood* from the other Dog; and carry it to the *Heart*; and the other Quill put into the other Part of the *Jugular Vein*, (which comes from the *Head*) out of which the second Dog's own *Blood* must run into Dishes. These two Quills being put in and tied fast, stop them with a Stick, till there be Occasion to open them.

All.

All things being thus prepared, fasten the Dogs on their Sides towards one another so conveniently, that the Quills may go into each other. After that, unstop the Quill that goes down into the first Dog's *Jugular Vein*, and the other Quill coming out of the other Dog's *Artery*; and by the Help of two or three other Quills, put into each other, according as there shall be Occasion, insert them into one another. Then slip the running Knots, and immediately the *Blood* runs through the Quills, as through an *Artery*, very impetuously. And immediately, as the *Blood* runs into the Dog, unstop the other Quills, coming out of the upper Part of his *Jugular Vein*, (a Ligature being first made about his Neck, or else his other *Jugular Vein* being compress'd by one's Finger) and let his own *Blood* run out at the same time into Dishes, (yet not constantly, but according as you perceive him able to bear it) till the other Dog begin to cry, and faint, and fall into *Convulsions*, and at last die by his Side.

Then take out both the Quills out of the Dog's *Jugular Vein*, and tie the running Knot fast, and cut the *Vein* asunder, (which you may do without any Harm to the Dog, one *Jugular Vein* being sufficient to convey all the *Blood* from the Head and upper Parts, by reason of a large *Anastomosis*, whereby both the *Jugular Veins* meet about the *Larynx*.) This done, sew up the Skin and dismiss him, and the Dog will leap from the Table and shake himself, and run away as if nothing ailed him.

In the performing of this Experiment, these Circumstances are to be observed: 1. That the Animals be fastened at such a convenient Distance, that the *Vein* or *Artery* be not stretched. 2. If the Pulse fails beyond the Quill in the *Jugular Vein*, you must draw out the *Arterial* Quill, and with a Probe open the Passage again in both of them, that the *Blood* may have its free Course.

Instead of a Quill, take a small crooked Pipe of Silver or Brass, so slender that the one End may enter into a Quill, and having at the other End, that is to enter into the *Vein* and *Artery*, a small Knob, and for the better fastening them to it with a Thread; for this is much more easy to be managed than a Quill. By
n. 20. p. 356.

IV. 1. It may be considered, in the Experiments of *Transfusion*, that the *Blood* of the *Emittent* Animal may, after a few Minutes of time, by the *Circulation*, mix and run out with that of the *Recipient*. Wherefore to be assured in these Trials, that all the *Blood* of the *Recipient* is run out, and none left in him but the *Adventitious Blood* of the *Emittent*, two or three or more Animals may be prepared and administered to bleed them all out into one. Considerations
concerning
Transfusion of
Blood: by.....
lb. p. 35.

2. It seems not irrational to guess beforehand, that the *Exchange of Blood* will not alter the Nature and Disposition of the Animals upon which it shall be practised; though it may be thought worth while, for Satisfaction and Certainty, to determine that Point by *Experiments*. The Case of *Exchanging the Blood* of Animals seems not like that of *Grafting*, where the Cyon turns the Sap of the Stock grafted upon into its Nature; the Fibres of the

Cyon so straining the Juice, which passes from the Stem to it, as thereby to *change* it into that of the Cyon; whereas in this *Transfusion* there seems to be no such Percolation of the *Blood* of Animals, whereby that of the one should be *changed* into the Nature of the other.

3. The most probable Use of this Experiment may be conjectured to be, that one Animal may live with the *Blood* of another; and consequently, that those Animals that want *Blood*, or have corrupt *Blood*, may be supplied from others with a sufficient Quantity, and of such as is good; provided the *Transfusion* be often repeated, by reason of the quick Expence that is made of the *Blood*.

*Experiments
of transfusing
Blood; by Dr.
Lower. n. 20.
p. 356.*

V. 1. I once bled a Mastiff into a Cur, and the little Dog bled out at least double the Quantity of his own *Blood*, and left the Mastiff dead upon the Table: And after he was untied, he ran away and shook himself, as if he had been only thrown into Water.

*The Transfu-
sion of the Blood
of a Calf into a
Sheep by the
Veins only; by
Sir Edm King.
n. 25. p. 449.*

2. I took a Calf and a Sheep, both of the larger Sort, and having prepared a *Jugular Vein* in each, I planted my Pipes and Quills as is usual, both in the *Jugular Vein* of the Calf (designed to be the *Emittent*) and in that of the Sheep (intended for the *Recipient*.) Then I took out of the Sheep 49 Ounces (*Avoirdupois* Weight) of *Blood*, before any other *Blood* was let in; about which time the Company concluding the Sheep to be very faint, and finding the *Blood* to run very slowly, I stopped the *Vein* of the Sheep, and unstopped the Pipe in the Calf, letting run out 10 Ounces into a Porringer, which was done in about 40" of a *Minute*. Then I conveyed Pipes from the *Emittent* Calf's *Vein* into the *Recipient* Sheep's *Vein*, and there ran a good free Stream of *Blood* for the Space of five *Minutes*, (though perhaps less swift than the first ten Ounces.) And not to be deceived in the running, I did often strike with my Finger the upper Part of the *Emitting Vein*, and thereby easily felt every Stroak answer'd on the *Recipient Vein*, just like a Pulse. And now, supposing that by this time, (*viz.* the Lapse of 5 *Min.*) the Sheep had received as much, if not more *Blood* than it had lost, we stopp'd the Current of *Blood* from the Calf, and closed also the *Vein* of the Sheep; and then having untied her, and set her down in the Room, she went about, and appeared to have as much Strength as she had before the Loss of her own *Blood*. Then resolving to bleed the Sheep to Death, we bound her the second time, and opened the *Emittent* Part of the *Vein* again; whereupon, having bled about 60 Ounces, she fell into *Convulsions*; and after the Loss of about 5 Ounces more, she died upon the Place. And being dress'd by the Butcher, there did not, in all the usual Places, appear above 3 Ounces of *Blood*; and the whole Sheep look'd of a lovely White.

We resolved also to see the Calf bleed to Death; but he having bled 10 Ounces, and then for the Space of 5 *Minutes* more into the Sheep, and rested a good while, the *Blood* by that time began to coagulate in the *Vein*; which made me open the *Carotid Artery*, letting thence run out about 25 Ounces of *Blood*, of a very lovely and vivid Colour, vastly excelling therein the *Blood* of the *Vein*. The Calf, when dress'd, had, by the Information
of

of the Butcher, as little *Blood* as the Sheep; and we saw him look whiter than they usually do in the ordinary way of Killing.

2. I took out forty five *Ounces* and better, of *Blood* out of the *Jugular Vein* of a Sheep, by which time we found her exceeding faint: Then I convey'd *Blood* from the *Jugular Vein* of a Calf into that of the Sheep, for the Space of seven *Minutes*, when we did believe, by the Continuance of a good Stream from the Calf, that the Sheep had already receiv'd more *Blood* than she had lost; whereupon we set her free, and she appear'd not at all concern'd at what she had endur'd in the Experiment, and continu'd lusty and strong. We then bled the Calf to Death, and receiv'd from him six Porrengers full of *Blood*, after the Sheep had been supply'd; each Porrenger contain'd 11 $\frac{1}{2}$ *Ounces* of Water. The Sheep lost four of the same Measures full of *Blood*; which being supply'd by that of the Calf, we reckon that the Calf lost ten such Measures in all.

3. I procured an Old Mungrel Cur, all over-run with the *Mange*, of a middle Size, and having some Hours before fed him plentifully with Cheese-Parings and Milk, I prepared the *Jugular Vein*, as we use to do the *Carotidal Artery* of the *Emitting Animal*. Then I made as strong a Ligature upon the Dog's Neck as I durst, for fear of choaking him, to the end, that the *Venal Blood*, which is much more sluggish in its Motion and Evacuation than the *Arterial*, might be emitted with the greater Advantage of *Impetus*. Then I took a Young Land-Spaniel of about the same Bigness, and prepared his *Jugular Vein*, as is usually done in the *Recipient Animal*. Having thus prepared them both, and placed them in a convenient Posture one to the other, I let slip the running Knots, and by frequent Compression of the Neck, (besides the Ligature I had made) by reason of the tardy Running of the *Venal Blood* out of the *Emitting*, transfused about fourteen or sixteen *Ounces* of the *Blood* of the *Infected* into the Veins of the *Sound Dog*, as near as I could guess by the Quantity of *Blood*, which ran into a Dish from the *Recipient*; supposing the *Recipient Animal* to lose near about the same Proportion to what the *Emitting* supplies.

The Transfusion of the Blood of a Mangy into a Sound Dog; by Mr. Tho. Cox. n. 25. p. 451.

The Effect of this Experiment was, no Alteration at all, any way to be observ'd in the *Sound Dog*. But for the *Mangy Dog*, he was, in about ten Days or a Fortnight's Space, perfectly cured: Which might with Probability enough, I think, have been expected from the considerable *Evacuation* he made; perhaps the quickest and surest Remedy for the Cure of that Sort of Disease he was infected with, both in Man and Beast.

4. Mr. Gayant transfused the *Blood* of a Young Dog into the *Veins* of an Old, which two Hours after did leap and frisk; whereas he was almost blind with Age, and could hardly stir before.

The Transfusion of the Blood of a Young into an Old Dog; by M. Gayant. n. 26. p. 479.

5. Since the 9th of March, 1667, we have transfused the *Blood* of three Calves into three Dogs. After which, the Dogs (all of them) did eat as well as before: And one of the three Dogs, from which so much *Blood* had been drawn the Day before, that he could hardly stir any more, having been supply'd the next Morning with the *Blood* of a Calf, recover'd instantly his Strength, and shew'd a surprizing Vigour.

The Transfusion of the Blood of Calves into Dogs; by Mr. Denis. n. 25. p. 473.

6. Several

A very plentiful
Transfusion, ex-
perimented upon
a Bitch; by
— n. 28.
p. 541.

6. Several successful Experiments have been made in *London*, of very plentiful *Transfusions*; and among others, (to mention a signal one) that upon a *Bitch*, which lost in the Operation near thirty *Ounces* of Blood, and was recruited accordingly. This Animal does not only survive to this very Day, but had another more severe Experiment soon after try'd upon her, by which her *Spleen* was cut out, without tying up the Vessels, whence that *Viscus* was separated: Since which time she took Dog, (even before the Wound was healed up) was with Puppy, and brought forth Whelps, and remains well and jocund. So that it is not too hastily to be concluded, that large *Transfusions* are dangerous.

The Transfusion
of the Blood of
4 Weathers into
an Horse; by M.
Denys. n. 30.
p. 559.

7. M. Denys writes from *Paris*, that they had lately transmitted the Blood of 4 Weathers into a Horse of 26 Years old, and that this Horse had thence received much Strength, and more than an ordinary Stomach.

The Transfusion
of the Blood of
one Lamb into
another; by S.
— n. 42.
p. 540.

8. May 8, 1677, at S. Cassini's in *Bononia*, there was open'd the *Carotid Artery* of a Lamb, when the Blood was let run as long as it could into the Right Branch of the *Jugular Vein* of another Lamb, from which there had before been drawn so much Blood as was judg'd it could be supply'd with from a Lamb of the like Bigness, whose Blood should be let out till it died. After this, there was made two Ligatures, pretty near to one another, in the Vein of the Lamb that had received the Blood; and this Vein was quite cut thorough between the two Ligatures. This done, the Lamb was unty'd, and went about without any Appearance of Feebleness; and its Wound being healed up, it grew like other Lambs. But the 3th of Jan. 1678, it died, and its Stomach was found full of corrupt Food. Its Neck being dissected, to see what had happen'd to the Vein cut through, it was found, that it had join'd itself to the next Muscle by some Fibres, and that the upper Part of that Vein had a Communication with the lower, by the means of a little Branch, which might in some manner supply the Defects of the whole Trunk

The Transfusion
of the Blood of a
Lamb into a
Spaniel; by S.
— n. 42.
p. 541.

9. May 20, 1668, at S. Griffoni's at *Udine*, the Blood of a Lamb was transfus'd into the Veins of a Spaniel, of a middle Size of that Kind, 13 Years old, who had been altogether deaf for above three Years; so as what Noise soever was made, he gave not any Sign of hearing it. He walked very little, and was so feeble, that being unable to lift up his Feet, all he did was to trail his Body forward. After the Transfusion practis'd upon him, he remained for an Hour upon the Table, where he was yet unty'd; but afterwards leaping down, he went to find his Masters that were in other Chambers. Two Days after he went abroad, and ran up and down the Streets with other Dogs, without trailing his Feet, as he did before. His Stomach also returned to him, and he began to eat more, and more greedily than before. But that which is more surprizing is, that from that time he gave Signs that he began to hear, returning sometimes at the Voice of his Masters. The thirteenth of June, he was almost quite cured of his Deafness, and he appear'd without comparison more jocund than he was before the Operation. At length, the 20th of the same Month, he had wholly recovered his Hearing; yet thus, that when he was call'd, he turned back, as if he that had call'd him had been very far off. But that happen'd not always; in the mean time he heard always when he was call'd.

VI. I think that a Silver Tube, with a Silver Stopper, somewhat blunted at one End, and flatted at the other, for Conveniency of handling, us'd already upon Beasts with good Success, is very proper for the *Transfusion* of Blood into the *Veins* of Men. The Operation may be thus perform'd: After the *Artery* is prepar'd in a *Lamb*, a *Kid*, &c. let a Ligature be made upon the *Arm*, &c. of a *Man*, hard enough to render the *Vein* turgid, in the Place you intend to insert the lesser End of the Silver Pipe, which is so fitted, that the Silver Stopper, thrust into the Tube, reaches somewhat by its blunt End beyond one of the Ends of that Tube. This done, divide the Skin of the Part in the same manner that is us'd in cutting an Issue, just over the *Vein* to be open'd. Then, with a fine Lancet, open the *Vein*; or, if you please, in case the *Vein* lie fair and high, (especially if the Skin be fine) you may open both together, according to the usual way of letting Blood. Which done, let an Assistant clap his Finger, or a little Boullter prepared before-hand, or the like, upon the *Vein*, a little below the Orifice, to hinder the Blood from ascending. Keeping that Position, insert the blunt-ended Tube upwards into the *Vein*: When it is in, hold it and the Skin close together between your Finger and Thumb. Then pull out of the Tube the Stopper, and insert the Pipe by which the *Arterial Blood* is to be infus'd from the *Eminent* Animal; managing the Remainder according to the known Method of this Experiment.

A Method of Transfusing Blood into the Veins of Men, by Sir Edm. King. v. 28. p. 522.

VII. The Experiment of transfusing Blood into a humane *Vein*, was perform'd upon Mr. Arthur Coga, Nov. 23, 1667, after this manner: Having prepared the *Carotid Artery* in a young Sheep, we made an Incision in the *Vein*, observing the Method above-mention'd, without any Alteration, but in the Shape of one of our Pipes, which we found more convenient for our Purpose. And having opened the *Vein* in the *Man's Arm*, with as much Ease as in the common way of *Vena-Section*, we let thence run out six or seven Ounces of Blood. Then we planted our Silver Pipe into the said Incision, and inserted Quills between the two Pipes already advanced in the two Subjects, to convey the *Arterial Blood* from the Sheep into the *Vein* of the *Man*. The Blood ran freely into the *Man's Vein*, for the Space of two Minutes at least; so that we could feel a Pulse in the said *Vein*, just beyond the End of the Silver Pipe. The Patient said, he did not feel the Blood hot, (as was reported of the Subject in the *French Experiment*) which may very well be imputed to the Length of the Pipes through which the Blood pass'd, losing thereby so much of the Heat, as to come into a Temper very agreeable to Venal Blood. That the Blood did run all the time of those two Minutes, we conclude from thence, First, Because we felt a Pulse during that time. Secondly, Because when, upon the *Man's* saying he thought he had enough, we drew the Pipe out of the *Vein*, the Sheep's Blood ran through it with a full Stream; which it had not done, if there had been any Stop before in the Space of those two Minutes, the Blood being so very apt to coagulate in the Pipes, upon the least Stop, especially the Pipes being as long as three Quills.

Transfusion practis'd upon a Man in London, by Dr. Richard Lower, and Sir Edmund King. n. 30. p. 557. Vid. sup. Sect. VI.

Quills. From the Quantity of the Blood, which ran through the Pipe into a Porringer, we judged that about 9 or 10 Ounces were receiv'd into the Man's Veins. The Man after the Operation, as well as in it, found himself very well.

The Effects of
several Liquors
mix'd with the
Blood, warm
from the Veins;
by Mr. Rob.
Boyle. n. 29.
p. 551.

VIII. 1. In the Year 1664, I mention'd to the Royal Society an odd Experiment I had formerly made upon Blood yet warm, as it came from the Animal, viz. that by putting into it a little *Aqua-fortis*, or Oil of *Vitriol*, or Spirit of Salt, (these being the most usual Acid Menstruums) the Blood not only would presently lose its pure Colour, and become of a dirty one, but in a trice be also coagulated; whereas, if some fine Urinous Spirit, abounding in Volatile Salt, such as the Spirit of *Sal-Armoniack*, were mingled with the warm Blood, it would not only not curdle it, or imbase its Colour, but make it look rather more florid than before, and both keep it fluid, and preserve it from Putrefaction for a long time. This Experiment I devised, among other things, to shew the Amicableness of Volatile Spirits with the Blood.

By Mr. Olden-
burg. ib.

This Experiment was publickly related by Mr. Boyle to the Royal Society in Dec. 1664, as appears by their Journals.

Liquor injected
into the Veins of
Dogs; by S. Frac-
casati. n. 27.
p. 490.
Aqua-fortis.

IX. 1. S. Fracassati, Professor of Anatomy at Pisa in Italy, having infus'd into the Jugular and Cruval Vein of a Dog, some *Aqua-fortis* diluted, the Animal died presently, and being open'd, all the Blood in the Vessels was fixed; but that in the Guts not so well. It was also observ'd, that the great Vessels were burst, perhaps by an Effort of Nature; even as in the greatest part of those that die of an Apoplexy, the Vessels of the Lungs are found broken. Upon which Experiment, the Author maketh these Reflexions; First, That an Apoplexy being often caused by a like Coagulation of the Blood, (as hath been observ'd by the Opening made of sundry Persons who died of that Distemper) it might be cured by a timely infusing some Dissolvent into the Veins. Secondly, That it is likely that that useful Secret, by which M. de Bills dissected Animals without any Effusion of Blood, consists in some such Infusion.

Spirit of Vitriol.

2. There was afterwards infused into another Dog, some Spirit of Vitriol, which had not so present an Effect; for the Animal complain'd a great while, and foam'd like Epilepticks, and had its Respiration very thick; and observing the Beating of his Breast, one might easily judge the Dog suffer'd much: Who dying at last, his Blood was found fixed in the Veins, and grumous, resembling Soot.

Oil of Sulphur.

3. Then there was injected into a Dog some Oil of Sulphur; but he died not of it, though this Infusion was several times try'd upon him. And the Wound being clos'd, and the Dog let go, he went into all the Corners of the Room, searching for Meat, and having found some Bones, he fell a gnawing of them with a strange Avidity, as if this Liquor had caus'd in him a great Appetite.

Oil of Tartar.

4. Another Dog, into whose Veins some Oil of Tartar was injected, did not escape so well; for he complain'd much, and was altogether swollen, and then died. Being opened, the Spectators were surprized to find his Blood not curdled,

curdled, but on the contrary, more *thin* and *florid* than ordinary; which seems to hint, that too great *Fluidity* of the *Blood*, as well as its *Coagulation*, may cause *Death*.

X. 1. In *Autumn* 1690, I injected into the *Jugular Vein* of a Dog about $\frac{1}{2}$ an Ounce of Crude *Mercury*, and observ'd the Dog soon after to have a dry short Cough, which by pretty Intervals seiz'd him. About 2 Days after, I found him troubled with a great Difficulty of *Breathing*, and making a Noise like that of a broken-winded Horse; there was no Tumor about the Root of his Tongue, nor any Swelling in the *Maxillary* or *Parotide Glandules*; neither was he observ'd to drivle, though I order'd him warm Broth in Expectation of a *Salvation*. The 4th Day after the *Injection* of the *Mercury* he died, being for the 2 Days before so troubled with an *Orthopnœa*, that he could sleep only when he lean'd his Head against something. I open'd him, and found about a Pint of *Bloody Serum* extravasated in the *Thorax*. I found also the Outside of the *Lungs* in most Places *blistered*; (for what I at first took to be some preternatural Dilatations of the *Vesicula* of the *Bronchia*, were only *Blisters*, or a Separation of the common Integuments of the *Lungs* from their Substance) some of these were larger than a Rouncival-Pea, others were smaller; but most of them contain'd *Mercurial Globules*, to be seen, even without opening, in several of them thro' the outward Skin. Several of them I found broken, and upon a little Pressure observ'd the *Mercury* to run out, and with it a little *Sanies*; but upon a pretty strong Pressure, I observ'd that a great Quantity of that *Sanies* issu'd out. When I open'd the Right *Ventricle* of the *Heart*, I found some Particles of the *Quick-silver* in the very midst of the *coagulated Blood* lodg'd there: And in that also, contain'd in the *Arteria Pulmonalis*. I observ'd moreover *Blood coagulated* after a very different Manner (which I want Words to express) from what I have seen at any other time, notwithstanding the various Methods I had used to *coagulate* it, and this in the Interstices between the *Columna* of the aforesaid *Ventricle*; and in this a greater Quantity of *Quick-silver* than any where else in the Dog. This *Coagulum* was in the *Vertex* of the *Ventricle*, adhering pretty closely to the *Columna* and *Parietes*. Opening the Left *Ventricle*, I found a very renacious *Blood*, *coagulated* and sticking firmly to the great *Valve*, including the *Tendons* of it, and a little resembling a *Polypus*. In this *Ventricle* I searched diligently for *Mercury*, but found none; whence it may appear, that the *Mercury* pass'd no farther than the Extremities of the *Arteria Pulmonalis*. This occasion'd the aforesaid *Blisters*, and forced its Way through the common Coat of the *Lungs*. I also open'd the *Aspera Arteria* down to the very *Bronchia*, but could find no *Mercury* in it, though I search'd diligently for it. Each of the Subdivisions, as well as Divisions, of the *Bronchia*, was fill'd with a *Sanies*, which when I wash'd away, I found Globules of *Mercury* in many Places under the *Bronchia*, and upon Examination they prov'd to be in the *Arteria Pulmonalis*. I have press'd these Globules backwards and forwards, and made some of them get out at the Holes made in the *Vesicula* or *Blisters* above described.

Mercury injected into the Veins of Dogs; by Dr. A. Moulin. p. 191. p. 486.

From hence may appear the Danger of using *Mercury* in Humane Bodies, so as that it may get into the *Mass* of *Blood*, especially into the *Lungs*; they wanting that brisk strong Motion which the Muscles have in other Parts, which are able to force it along with the *Blood*, in order to the raising a *Salivation*. Their lax spongy Texture makes them extremely unfit for clearing themselves of so troublesome a Guest as *Mercury* is. That it has this Effect on Humane *Lungs*, is plain from what we daily see in Persons that have been often *fluxed*, who are afterwards observ'd to die of *Consumptions*, that will not give Way to *Medicine*.

By Dr. Chr.
Pitt. n. 240. p.
184.

2. Dissecting a Chance Dog, that had *Mercury injected* into one of the *Jugulars*, (but how long it had been in his Body I cannot tell) I found it thrown out of the *Blood* into the *Cavity* of the *Abdomen*, as likewise some Appearance of it in the other *Cavities* of the Body. All the *Glandules* were very turgid and full of *Liquor*, especially in the *Ventricles* of the *Brain*, and all round there was a great Quantity of *Serum*. This may be call'd a true *Hydrocephalos*.

Medicated Li-
quors injected in-
to Humane
Veins; by Dr.
Fabricius. n. 30.
p. 564.

XI. 1. We have *injected*, by a Siphon, about 2 Dr. of a *Laxative Medicine* into the *Median Vein* of the Right Arm, of 3 Patients in the *Hospital* at *Dantzick*. One of the Patients was a lusty robust Soldier, dangerously infected with the *Venereal Disease*, and suffering grievous Protuberatings of the Bones in his Arms. He, when the *Purgative Liquor* was *infused* into him, complain'd of great Pains in his Elbows; and the little *Valves* of his Arms did swell so visibly, that it was necessary by a gentle Compression of one's Finger to stroak up that Swelling towards the Patient's Shoulders. Some four Hours after, it began to work, not very troublesome, and so it did the next Day, infomuch that the Man had 5 good *Stools* after it. Without any other Remedies, those Protuberances were gone, nor are there any Foot-steps left of the above-mention'd Disease.

The two other Trials were made upon the other Sex. A Marry'd Woman of 35, and a Serving-Maid of 20 Years of Age, had been both of them from their Birth very grievously afflicted with *Epileptick Fitts*, so that there was little Hopes left to cure them. They both underwent this Operation, and there was *injected* into their *Veins* a *Laxative Rosin*, dissolved in an *Anti-Epileptical Spirit*. The first of these had gentle *Stools* some Hours after the *Injection*, and the next Day; the Fitts, recurring now and then, but much milder, are since altogether vanish'd. As for the other, viz. the Maid, she went the same Day to *Stool* 4 times, and several times the next; but by going into the Air, and taking Cold, and not observing any Diet, cast herself away.

'Tis remarkable, that it was common to all three to *Vomit* soon after the *Injection*, and that extremely and frequently.

Medicines In-
jected into Hu-
mane Veins;
by — n. 39.
p. 766.

2. Mr. Smith hath adventured to open a Vein, and *infuse* some *Medicines* into the *Blood* of two Persons in the *Hospital* of *Dantzick*, desperately infected with the *Pox*, whereof the one recover'd, and the other died. Afterwards, (viz. Jul. 1668,) the same Physician, together with M. Scheffeler,

Ver, repeated the Experiment, by *infusing altering Medicines* into the *Veins* of the Right Arms of three Persons; the one lame of the *Gout*, the other extremely *Apoplectical*; and the 3d reduced to Extremity by that odd Distemper the *Plica Polonica*. The Success of this, as M. *Hevelius* (who was the only Person admitted to be present at the *Operation*) informs me, was, that the *Gouty* Man found himself pretty well next Day, and shortly after went to work, it being Harvest-time, and has continu'd well ever since, leaving the *Hospital* Aug. 17, 1668, and professing himself Cured; The *Apoplectical* hath not had one *Paroxysm* since; and the several Sores which the *Plica Polonica* had occasion'd, are healed, and both these Persons are able to work.

XII. It is commonly observ'd, that when any *Blood* is become Cold in a Dish, that Part which is beneath the Superficies appears much blacker than that on the Top. S. *Fracassati* maintains, that this blackish Colour comes from hence, that the *Blood*, which is underneath, is not exposed to the *Air*, and not (as it is vulgarly supposed) from any Mixture of *Melancholy*. To prove which, he assures, that upon its being exposed to the *Air*, it changes Colour, and becomes of a *Florid Red*.

An Observation upon Blood grown Cold; by S. Fracassati. n. 27. p. 492.

XIII. Take a Quantity of *Filings* of *Copper*, fresh made, and place them in a Glass Vial, whose Bottom is broad and even, and then pour on an *Urinous Spirit*, either of *Sal Armoniack*, or of *Urine* itself, not made with *Quick-Lime*. 1. The Glass should not be fill'd up much above one half-way, and then must presently be so exactly stopp'd, that no *Air* be capable of intruding. You may then observe for 4, 5, or six Days, the *Tincture* will be growing deeper and deeper, and then will keep a Stand for 2 or 3 Days, more or less, and afterwards will gradually decline, until it become quite pale, and void of all Colour. When it is in this State, the easiest Way of performing the *Experiment*, for your own Satisfaction, is to decant this *clear Spirit* into a Glass, so as to leave all the *Filings* behind, and that will demonstrate that the *Filings* did not give this *Tincture de novo*, but that it belongs to the Influence of the *Air*. But in case you are furnish'd with an *Air-Pump*, and can pour off this *Pallid Liquor* in a *Vacuo Aeris*, and there stop it up securely, you may then preserve it so long as you please, and exhibit it to Advantage. You may also observe, that so soon as you let in the *Air*, the upper Superficies immediately tinges first, and so descends deeper and deeper, until it has penetrated the whole; and this it does the sooner, if the Glass be wide, and the Liquor by consequence have a large Superficies: Or if you pour it out of one Glass into another, the *Air* makes a more sudden Change of the whole.

Some Effects of the Air upon Blood, explain'd by an Experiment of the Change of Colour in a clear Liquor upon the Admission of Air; by Dr. Fred. Glare. n. 204. p. 898.

That this Liquor should lose its *Tincture*, is not to be wonder'd at; for even Ink itself, by standing still, will lose much of its *Tincture*; and so do the *Tinctures* of many Minerals: Nor can we expect that there should be any *Precipitation* discernible at the Bottom of the Glass, if we consider, that two Gr. of *Copper* will give a deep Colour to three Ounces of *Urinous Spirit*.

Spirit. But this is surprizing, that since our *Menstruum* (that is our *Spirita*) is divested of its *Venercal Particles* which gave the *Tincture*, and is become as clear as Rock-water, and being separated from its *Metalline Filings*, does yet upon the Approach of the *Air* immediately afford a very *blue Tincture*. This indeed plainly shews, that there must be conceal'd in the Pores of the *Liquor* such *Particles* as are of a *Cupreous Nature*. But how may this come to pass? To which I answer, I cannot be so vain to think, that the *Air* gives the *Matter* of the *Colour* to the *Spirit*, but that it conveys into it such *Partieles* as do stimulate and give Motion to the *Menstruum*, and enable it to dissolve those *Particles* thoroughly, that for want of more *Air* had not been fully broken in Pieces.

In the next Place, I discover two very differing Sorts of *Matter* that our *Urinous Menstruum* acts upon in this *Experiment*: One I call a *Sulphureous Matter*, which gives the *blue Colour*, and does let it fall again; and another which deserves the Name of *Saline*; but though it be taken up into our *Tinging Spirit*, does yet notwithstanding afford no *Tincture* whilst secluded from the *Air*. This was made to me very plain and clear; for having found out a Way to separate a white slimy Substance out of our clear *Liquor*, I then destroy'd the *Experiment*; so that when exposed to the *Air*, the *Menstruum* would no more give the least *Tincture*. For a farther Confirmation, this white *Saline Substance* being in a small Quantity dissolv'd into any proper *Urinary Menstruum*, exhibits the *Experiment* set down to Advantage; and gives a much finer and brighter Colour, than what is drawn from *Crude Copper*, or from the *Sulphureous Parts*.

The great Interest the *Air* has in this *Experiment*, made me think of applying it to the great *Change* that is made upon *Blood*; for it is obvious to every body, that there is a great Difference in Colour betwixt the *Venal* and *Arterial Blood*: The *Venal*, as soon as it is let out of the *Vein*, is observ'd to be of a dark Complexion, and requires some Time to be expos'd to the *Air*, before it obtains a *florid Red*; and that only Superficies which is contiguous to the *Air*, does for a good while become *Red*; for I have turn'd up a Cake of *Blood* 24 Hours after it had been let out, and found it of a very dark and opaque Colour; but the *Air* has immediately given it a bright and florid *Red Tincture*. This so manifest a *Change*, made by virtue of the *Air*, is contrary to the Opinion of those Anatomists, who would have *Respiration* to be chiefly to promote the *Circulation* of the *Blood*, and that great *Apparatus* of *Air-Vessels* to be for a Fan to cool the Mass of *Blood*, and that the *Air* returns unalter'd, and not capable of making any great Alteration, being deny'd any Ingress into, or Mixture with the *Blood*. But the Observation is certain and unerring, that the *Venal Blood*, as it passes the Right *Ventricle*, at its Entrance into the *Lungs*, is of a very opaque and blackish Complexion, and in its Passage through the *Lungs*, before it comes to the Left *Auricle*, is changed into a very florid and bright *Red*. And I have often observ'd, that Persons that have vomited *Blood*, upon a Rupture of some Capillary Vessels of the *Lungs*, have sent up a very Frothy or Spumous *Blood*, and at the same time of a bright Scarlet *Red*. That it was Frothy, argues that the *Air* had

had incorporated with it; that it was *Red*, was due to the Tinging Power of the *Air*. To expect that this *Change* should be made in the *Heart* by any local Ferment, or *Flamma Vitalis*, is fruitless; because we find it performed before its Arrival there; the Structure of the *Heart* denoting that Engine to be principally made for projecting the *Blood*, in order to a Circulation through those various *Arteries*, or Pipes, which are branched from the *Heart*. Let us therefore examine the Structure of the *Lungs*, and we shall soon discover it to be a *Pneumatick* Engine made principally for taking in *Air*, and that in great Quantities. It's true, we may call the *Lungs* a Contexture of *Veins*, *Arteries*, *Nerves*, *Lympha-ducts*, &c. and that these do very much make up the *Parenchyma* (as some do use the Word) of the *Lungs*; but yet we shall find the great Bulk of the *Lungs* to be *Vesicular*. It seems to me to be a Continuation of the *Aspera Arteria*, or Wind-pipe, divided and subdivided into many Branches, and these still spun out into lesser and lesser Pipes, all of them hollow; the farther they run, the thinner their Sides do grow, which upon the *Inspiration* of the *Air* do swell up and grow round, and upon *Expiration* do fall something flaccid, and abate something of that Figure, as the *Microscope* does plainly represent.

It is therefore more than probable, that the *Air* should insinuate itself into the Machine, which is so truly adapted to receive it, and that in great Quantity; for in each *Inspiration*, the *Lungs* are stretched at that rate, as to take up double the Room they do in the State of *Expiration*, or in their compressed State; and even in this State, the *Air-Bladders* are not fully evacuated, but contain *Air* for good Purposes. Nor can it be pretended, that any Augmentation is due to the *Expansion* of the *Blood-Vessels*, or any other which do not swell beyond their usual Tension in each *Inspiration*. The *Sanguiferous Vessels* are divaricated through all the *Lobes* of the *Lungs*, and do give a very close Attendance to each *Vesicula*, (for there is not the least *Vesicula* but has a *Capillary Vessel* which intiamtely insinuates into it) in order to receive some considerable Benefit from it; and this appears to the Eye, for in an Infant a dark and foul *Blood* is changed into a bright florid *Red Colour*. Nor is the *Air* thus infused into the *Lungs* for a bare Colour, and of no farther Consideration; but I am apt to believe the great *Fermentations* of the *Blood* the Cause of the *Motions* and *Actions* of the *Muscles*; the *Animal Spirits* themselves, the great Spring of *Motions*, deriving their Energy and Powers, if not Nature, from hence. But *Corollary 1.* That the *Air* is full of *Volatile Salts*, none will deny; but that these *Salts* must bear the Name of *Nitrous Salts*, is called in question by this and some other Experiments I have made. *Nitrous Salts* seem to me not to have any Property of *Volatile Salt*. *Nitre* is a Salt of so fix'd a Nature, that it will continue melted in a very strong Fire, with scarce any Evaporation; but if you put in to it Charcoal or Brimstone, or give it an Accension by another *Encheiresis*, you may obtain a great Quantity of as fix'd a Salt as any Concrete whatever affords; so that to me Gold seems not of a more fix'd Nature.

Corol. 2. A Standard of *Volatile Salts* should be settled; at present I can think of none better than *Water*: That Salt which, in *Distillation*, is more
fix'd

fix'd than *Water*, ought not to be reckoned among *Volatile Salts*. This Standard will be justify'd by good Measures, grounded on Experience: For all *Salts* that are truly *Volatile*, as far as I could observe, are really lighter than *Water*; that is, in a *Chymical* Sense, do with a less Degree of Fire *sublime* in our Glasses, or come over the *Helm*, than *Water* does. This I find justify'd in our *Volatile Salt* of *Amber*, erroneously so called; for it does not come up to our Standard of *Volatility*, and is really no *Volatile Salt*; as will be made appear: If you take this supposed *Volatile Salt*, and distill it in a *Retort*, or Head and Body, with common *Water*, the *Water* will ascend in such a Degree of Fire where the *Salt* will not; for you must increase your Fire considerably to make it rise after the *Water* is gone, and has left the dry *Salt* at the Bottom. This made me enquire farther into the Properties of this *Salt*, which did not at all correspond with *Volatile Salts*, (for all true *Volatile Salts* are *Alkalies*) but on the contrary would ferment with them, and quite destroy the Property of true *Volatile Salt*, by bringing them to a dull insipid *Salt*, which some call *Sal Neutrum*; and also by fixing their *Volatile* Nature, not only in putting them by the Standard of *Volatility*, but also does quite destroy their *spirituous* and stimulating Smell, by vertue of which they have been always deservedly esteemed such excellent *Cephalick* Medicines. Therefore examining this *Salt* yet a little farther, you will plainly prove it to be an *Acid*, that corrodes *Iron*, turns Syrup of *Gillyflowers* green, destroys the Tincture of *Lignum Nephriticum*, and does not ferment with common *Acids*; so that it plainly belongs to the Tribe of *Acids*, and should be struck out of the Catalogue of *Volatile Salts*; and perhaps out of the Number of *Specifick Cephalicks*, and rather to be degraded amongst the *Diureticks*, and even in that Rank to have but an inferior Station; for it seems to me to be but a dull Medicine, and more valuable for its Price than great Virtue, especially if quite divested of all its Oil, in which the great *Cephalick* and *Cordial* Virtues must needs be owned to consist.

Coroll. 3. That *Volatile Salts* have a great Property to draw *Tinctures*, and do particularly advance those Colours that are disposed to be *Red*: For though the *Spirit of Wine* be a very *Catholic Menstruum*, and draws a very deep *Tincture* of *Cochineal*, yet we have often observed, that if we put to this *Tincture*, when highest, a small Proportion of *Volatile Salt*, that would advance it to a great, even a double Degree. Thus I have observed it to advance the *Tincture* of *Arterial Blood*; and, which is very Curious, if you dissolve it in your *Blood* whilst you are bleeding at one of your Veins, that *Blood* will become very *Florid*, and like *Arterial Blood*. Therefore, since *Nitrous Salts* produce none of these tinging Effects, this *Corollary* seems much to favour the Notion, that the Effects of the *Air* upon the *Blood* may be due to such *Salts* as are of a *Volatile Alkalifat* Nature.

Corol. 4. Contagious Diseases are communicated by the *Air* inspired at the *Lungs*; and this seems more probable, than what Dr. Needham and others have endeavoured to make out, with more Difficulty, in attributing the same Effects to the *Air* taken in our Meat by *Mastication*, and swallow'd down in

in our Drink, and communicated to our *Chyle*, from thence to our *Blood* and *Spirits*. But this way a very small Quantity of *infected Air* is communicated, if we compare it with what is communicated to the *Lungs*; for in each *Inspiration*, *Humane Lungs* of an ordinary Size do at least take in such a Quantity of *Air*, as will fill up a Quart Bottle; and in the Space of a Minute I have made twelve *Respirations*, (when I was very sedate, and drew in my Breath very treatably) and in that time by consequence took in as much *Air* as would fill up a Vessel capacious enough to hold 3 Gallons of Water; and it's plain, that the *Air expired* returns much alter'd; forasmuch as the *Breath* or *Halitus* returns *impregnated* with a moist Vapour, and such an one as does many times indicate the Temper of the *Blood*. From this *Halitus*, *Imposthumations* of the *Lungs* are frequently predicted: Such as have *Sulphureous Blood* shall emitt no very pleasing, but rancid Exhalations. Nor does the *Blood* only clear itself of some Vapours in *Expiration*, but also imbibe and impregnate itself with such Particles as are necessary to maintain *Life* in *Inspiration*: For a Man could not subsist long in a Tun of *Air*; should he be kept close in so capacious a Vessel; as we have found by Experiments made with several *respiring* Animals, Dogs, Cats, and Birds, &c. that these would soon die there; so that we need constant Supplies of vast Quantities of fresh *Air*; which makes me believe, that those Particles separated out of the *Air* by the *Lungs*, are very sparingly deliver'd or mix'd with the common *Air*; but yet with this Difference, that the more compress'd the *Air* is, the more it contains of that *Vivifying Salt* or *Spirit*; and on the contrary, the more rarify'd, the less is found: For we are told by the Experience of such as have been on the *Pike of Teneriff*, that their Breathing is more difficult there, than at the Bottom, where the *Air* is more compressed. And we have found Birds and Mice, &c. would live as long again in a Vessel where we had crowded in, by a Syringe, (or any other condensing Engine) a double Quantity of *Air*, as they did where they were confined only to common *Air*. To conclude, since the *Vivifying* Particles in the *Air* seem to be very sparingly disseminated through it, I am apt to believe, that the *Noxious* and *Pestilential* are more sparingly scatter'd up and down (the Author of *Humane Nature* having taken more Care for its Preservation than for its Destruction) and therefore it may much better be inferr'd from the Premises, that *Contagious Diseases* must needs be communicated to the *Blood* by *Inspiration* into the *Lungs*, rather than any other way.

XIV. 1. A Curious Person writes from *Paris*, that there they had, in the House of a Physician, newly opened a Man's *Vein*, wherein they found *Milk*, instead of *Blood*.

White Blood;
by M. . . . n. 6.
p. 100.

2. A Maid, after eating a good Breakfast about 7 in the Morning, was let *Blood* about 11 the same Day in her Foot; the first *Blood* was received in a Porrenger, and within a little while it turn'd very *White*; the last *Blood* we received in a Sawcer, which turn'd *White* immediately, like the *White* of a Custard. Within 5 or 6 Hours after, I chanced to see both, and that in the Porrenger was half *Blood* and half *Chyle*, swimming upon it like a *Serum*

By Dr. Lowes,
ib. p. 117.

as *White* as Milk, and that in the Sawcer all *Chyle*, without the least Appearance of a Drop of *Blood*; and when we heated them distinctly over a gentle Fire, they both harden'd as the White of an Egg when 'tis heated, or just as the *Serum* of *Blood* doth with heating, but far more *White*. This Maid was then in good Health, and only let *Blood* because she never had her *Courses*, yet of a very *florid* clear Complexion.

By Dr. H. Beal.
n. 8. p. 139.

3. About 20 Years ago, Mr. *Tho. Day* (an Apothecary in *Cambridge*) told me, that himself let a Man *Blood* in the Arm, and the *Blood* was as *White* as Milk; as it ran out of his Arm, it had a little dilute *Redness*; but as it fell into the Vessel, it was presently *White*; and it continued like Drops of Milk on the Pavement, where-ever it fell. The Conjecture which Dr. *Eade*, a Physician there, had of this Appearance, was, that the Patient had much fed on *Fish*; affirming withall, that he had soon been a *Leper*, if not prevented by *Physick*.

The Constitu-
ent Part of Hu-
mane Blood, by
Dr. Raym. Vi-
cussens. n. 241.
p. 224.

XV. 1. Cum mihi *Rex*, ob edita in *Lucem* Opera quædam Medica, Pensionem Annuam Librarum mille ad *Vitam* liberaliter concessisset, ne Principis omnium Maximi Favore atque Gratia indignus videri possem, statim me totum contuli ad amplam accuratamque Morborum Internorum Historiam contexendam. In ipso vero Limine hujus Operis, statuendum atque clare demonstrandum duxi, quæ sit *Essentia*, quæ *Vis* eorum Corporum quibus *Sanguis* constat; tum, quod majus est, quæ tandem inter illa reperiatur proportio quantitatis. In *Sanguine* igitur contemplando curas omnes meas defixi, & *Cl. Boylai* nunquam satis laudandi Vestigiis in hoc Suscepto meo insistendo, & ulterius quam ille progredi, si possem, conando, quod diu multumque optaveram, vixque sperare ausus eram, id tandem, quamvis non sine gravibus longisque Laboribus, consecutus sum. Quò jam *Chymici*, *Medicique* illi (absit verbo invidia) prorsus errasse mihi videntur, qui illud quod è *Sanguine Sal* elici solet, merum *Sal Acre* seu *Alkalinum* esse, nullâque *Industria* verum *Sal Acidum* ex illo educi posse, hætenus crediderunt. Si pariter, tum *Chymici* tum *Medici* erravere, qui eam, quam à *Natura* partes *Vivifici* hujusmodi *Liquoris* inter se habent, proportionem *Quantitatis*, nullâ reperiri posse *Arte* ab elapsis tot *Seculis* judicaverunt.

Equidem scio, & fateor, *Sal* sive *Volatile*, sive *Fixum*, *Ignis* vi extractum è *Sanguine*, *Fermentationem*, quod aiunt, cum *Fluoribus* quibusvis *Acidis* etiam mitioribus pati: præterea id ipsum *Sal Sublimatum Corrosivum* dissolutum præcipitat, & *Syrupum Violaceum Viridem* facit, ut nemo nescit, adeoque multas *Salino-Acres*, seu *Alkalinas* habet particulas, quibus hæc præstat; sed *Salinas* quoque *Acidas* non paucas complectitur, ut adducendis modo in medium Experimentis constabit certo certius. Quamobrem illud esse à *Natura* sua verum Corpus *Salsum*, exploratum deinceps omnibus erit, ac cognitum, nec non extra omnem omnino Controversiam positum. Corpus *Salsum*, cum dico, conflatum intelligo ex partibus quidem *Salino-Acribus* & *Salino-Acidis*, sed *Salino-Acribus* longè pluribus; ex quo illud consequens est, ut integrâ inviolatâque *Naturâ*, *Salino-Acida* majore *Salino Acrium* copia superatæ, & quasi Sepultæ delitescant.

Cum

Cum *Sal Acidum*, sub forma scilicet *Spiritus Acidi*, eruere vellem, si fortè possem, è *salso Sanguinis*, quod jam diu in Innatum & Adventitium, seu ab Alimentis potissimum suppeditatum, divisi; Libras 50 ejusmodi Liquoris, prius Æneo in Vase Ignis vi, quantum par erat, exsiccati, per totas 24 horas in Fornace Figuli torrui, seu, ut aiunt, Calcinavi; adeoque illas ad tres *Uncias & Drachmas 7* Cineris Grisei redegi. Ex hoc Cinere, Gustui valde Aspero, cum *Spiritibus Acidis* fermentescente, & Tincturæ Florum Malvæ Viridem Colorem inducente, *Lixivium* confeci, ex quo *Unciam* unam *Salis Fixi* candoris penè Nivei, eduxi: *Salis* illius, quod, ut supradictum est, cum omnibus *Spiritibus Acidis* Fermentescebat, Sublimatum Corrosivum dissolutum præceps agebat, & Syrupum Violaceum colore Viridi tingeat, 7 *Drachmas*: & 42 *Grana* 3 circiter *Unciis* Boli siccissimi admiscui: Ex mixto hujusmodi *Retortâ* Luto munitâ incluso Igne, aiunt, *Reverberii* extraxi *Semiunciam* & *Grana* 18 *Spiritus*, colorem *Spiritus Sulphurei* quodammodò imitantis, & ipso Spiritu *Aceti* Acidioris Linguae Judicio.

Spiritus ille plurimum Fermentatur, non solum cum Oleo & *Sale Fixo Tartari*, verùm etiam cum *Sale*, sive *Fixo* sive *Volatili*, & subrufo Spiritu, quæ Ignis vi extrahuntur è *Sanguine*. Præterea ipsemet *Spiritus* Rubefacit Syrupum Violarum, Tincturam Heliotropii, & Florum Malvæ. Quare liquidè constat *Sal* ex *Sanguine Humano* extractum, debere credi verum *Salsum*; id est *Salsum* ac quoddam *Acre Acidum*. Quod omnia inter *Salsa* perfectam cum solo *Sale Fixo Tartari*, & nullam cum *Sale Marino*, sive odore sive sapore, sive Dentium stupefaciendorum vi, sive aliis quibusvis Effectibus suis, Similitudinem habere videtur, ut experientia demonstrat. Unde patet ulterius Extractionem *Salis Acidi* ex eodem *Sanguine*, difficilem adedò hætenus ab omnibus existimatam, reipsa fieri, si docta peritaque manus non desit.

Extracto & quasi per vim avulso Spiritu illo, de quo jam dixi, ex intimis Visceribus *Salis Fixi*, ubi conclusum penitusque obrutum latitabat, sub forma Solidi quidem Corporis, sed tamen in partes exiguißimas divisi, confectum est à me *Lixivium* è residua in fundo Vasis Materia, ex quo binæ *Drachmæ* cum dimidia & *Grano* uno *Salis Fixi* Grisei subalbescantis eductæ fuere: Istud *Sal* cum nullo liquido *Acido*, saltem ad sensum Fermentescebat, si *Oleum Vitrioli* excipiatis; id tamen ut *Sal Acre*, sive *Alkalinum* purum, aut fere purum, spectandum est; quoniam ad id, quod jam particulas suas *Salino-Acidas* omnes, vel ferme omnes, deposuit; accedit istud præterea, quod Syrupum Violaceo prius nonnihil excalesceto, & Tincturæ Florum Malvæ Viridem tribuit Colorem, *Sublimatum Corrosivum* dissolutum præcipitat, & cum *Oleo Tartari* nullo modo Fermentatur. Adde quòd nec vel tantillum immutat colorem Tincturæ Heliotropii, quam tamen *Acida* omnia, cum solida tum liquida, Rubefaciunt.

Quodam elapso tempore, postquam è *Fixo Sanguinis Humani Sale Spiritum Acidum* elicuissem, Viridis recordatus sum Coloris, quem assumpserunt ultimæ Guttæ *Spiritus* Subrui hujusmodi Liquoris, cum illum à duobus jam elapsis Annis ex Alembico Æneo distillarem. Viridis autem, planeque Porraceus Color Guttarum illarum Subrui *Spiritus Sanguinis*, meâ quidem Sententiâ, suam ducebat Originem è quibusdam *Vitrioli* particulis *Salino-Acidis* Ignea vi

ex *Ære Alembici*, avulsis, & ipsis intimè admistis: Cum primum recordatio hujusce Coloris animum subrepisset, hæc non levem mihi peperit anxietatem; quoniam per hunc Casum, quem verissimum etiam atque etiam Testor, vix dubitare mihi licuit quin *Sanguis* à me in Vase *Æneo* exsiccatus, antequam in Fornace Figuli torreretur, permultas ex *Ære*, Igne avulsas, partes *Vitrioli Salino-Acidas* intra textum suum interius admisisset, quæ cum partibus ejus *Salino-Acribus* stricissimo, ne dicam indissolubili, Nexu copulatæ *Salsum* efformaverant corpus, è quo *Spiritus* meus *Acidus* elicitus fuerat.

Cum hæc apud me, anxius sanè, aliquandiu meditatus essem, & multum dubitarem an ex *Sanguine Humano*, qui nullo extraneo *Sale Acido* gravidus esset, Liquor Acidus educi posset, rei tanti momenti veritatem indagare, & meum, si quis esset, errorem detegere statui. Quamobrem *Salis Fixi* è *Sanguine Humano* à me in Vasis Figulinis exsiccato eruti, *Unciam* unam exactissimè miscui cum *Unciis* tribus *Boli* siccissimi, & tenuissimum in Pulverem redacti; mixtum hoc in *Retortam* Luto, uti solet, obductam immisi; hanc deinceps in *Chymica* mea *Officina Reverberii Furno* imposui, & *Cervici* ejus adhibito aptatoque Excipulo, atque juncturis *Vesicâ* *Suillâ* madefactâ opertis, & ritè obturatis, Igne primùm lento, ac deinceps gradatim, quantum oportebat, aucto, *Phlegmatis Drachmam* semissem cum *Granis* 10 Extraxi, *Drachmas* vero 3. *Spiritus Acidi* primum Extracto *Spiritui* prorsus similis: Hicce *Spiritus* dentes plurimum stupefaciens Gustus judicio inter Liquores omnes *Acidos* ferè *Acidissimus* mihi videtur, & omnes omnino habet dotes, quas *Spiritum Acidum* primò è *Sanguine* elicitum habere diximus. Felicissimus hic meditationum mearum Laborumque meorum successus, qui totam mentem meam blandâ profectò lætitiâ perfudit implevitque, concepta omnia circa Extractionem *Salis Acidi* è *Sanguine* dubia mihi abstulit penitusque delet.

Demum è Residua in fundo Vasis Materia *Lixivium* confeci, ex quo *Drachmas* 5. *Salis Fixi* subalbescens Extraxi. Hinc manifestè patet me totum non eliquisse *Spiritum Acidum*, quem elicere potuissem à *Sale Fixo*, quod una cum *Bolo* in cavitatem *Retortæ* intruseram: Id autem ex animo sic factum est, ne scil. *Sal Fixum*, cujus Analysin rursus institueram, omnibus suis partibus *Salino-Acidis* prorsus exueretur. Et vero illud omni suo *Sale Acido* exuere nolui, exploraturus subinde an quodammodo discreparet à *Sale Fixo*, è quo primum *Spiritum Acidum* eduxeram, imò & tantum eduxeram quantum suppeditare potuerat. Verùm nullum omnino inter bina hæc *Salia* Discrimen observare licet. Siquidem ambo levem Colorem Viridem prorsus similem tribuunt *Tincturæ* *Florum Malvæ*; & licet nullam, saltem sensibilem, patiantur Fermentationem, cum *Spiritus Nitri* aut *Vitrioli* aut quivis alius hujusce generis, ipsis affunditur; vehementer tamen, & æqualiter Fermentescunt, cum unâ vel alterâ *Olei Vitrioli* gutta irrigantur. Ex his certo certius patet *Sal Fixum Sanguinis Humani* in Vase *Æneo* exsiccati, è quo primâ vice *Spiritum Acidum* extraxeram, nullis partibus *Vitrioli Salino-Acidis* gravidum fuisse; proptereaque, nequaquam dubitandum est, quin prima *Spiritus Acidi* è *Sanguine Humano* Extractio undequaque vera extiteret.

Venit fortasse hoc loco in animum, *Sal Acre-Acidum*, & *Spiritus Acidum* educta è *Sanguine* non trahi ex hoc Liquore Virtute Ignea, sed ex Igne ipso, tanquam è Materia, nunc primum gigni ac effici, sed experto credite. E *Sanguine* persæpe ipsemet puro calentis *Solis* ardore elicui subrufum *Sal Saporis* illo *Acrioris*, qui in *Sale* Ignis vi extracto percipitur; quam majorem, ut ita dicam, *Acritudinem* continuò Aciditas Linguae manifesta subsequitur: ac prioris quidem Experimenti hæc ratio est, quod *Sol* illius *Salis* acumina parum, Ignis vero multum, obtundit; posterioris autem hæc, nimirum quod *Sal Acidum Volatile*, cujus vi *Sanguis* naturaliter Fermentescit, arctissime copulatur cum particulis *Salino-Acribus Sanguinis* ipsius paulatim refrigerantis ubi è Vasis suis emissus est. Hi porro diversi *Sales* mutuò implexi difficiliter longè à se invicem separantur calore *Solis* benigno & dulci, quàm violento Ignis ardore. Hinc fit, ut *Sal* illud, de quo nunc Sermo habetur, *Acre-Acidum* sapiat, & vix cum *Spiritibus Acidis* Fermentetur, si *Vitrioli Oleum* excipiat.

Nunc accipite quâ Viâ, quibusque Adjumentis consecutus sim tandem justam illam, necnon exactam, Proportionem Quantitatis, quam Corporibus illis quibus *Sanguis* constat, Natura tribuit. Primum igitur non unius aut alterius *Hominis Sanguinem*, sed multorum, eorumque non Sanorum modò sed *Ægrorum*, non ejusdem sed diversi ac dissimillimi Temperamenti, ad exactas Analyseos Regulas ita examinavi, ut ejusmodi Liquoris Principia, alia ab aliis, separaverim, & quidem absque ulla Substantiarum jacturâ. Illud enim tantum videbatur jam esse reliquum, ad habendam Quantitatem respectivam illorum Corporum, ut singula seorsim revocarem ad Trutinam: sed profecto plus aliquid requirebatur. *Phlegma* enim, *Spiritus* subrufus, & *Oleum* fœtidum secum partes *Salinas* trahunt, quas neque separare licet, adeoque nec ponderare. *Phlegma* igitur quoddam excogitavi, & composui omnimodam habens similitudinem cum vero *Phlegmate Sanguinis*, quod deinceps appellabo Naturale, quamvis Arte *Chymica* extractum; miscui videlicet pondus dimidii *Grani Salis Volatilis* è *Sanguine Humano* educti, cum duodecim *Unciis* Aquæ Fontanæ distillatæ: Ac quamvis duæ illæ moles ita inter se essent ut 11525 ad 1, tamen Aqua tota sic *Salis* tantilli Vim sensit, ut statim quidem levissimum Candorem, & exiguissimum Fœtorem quendam induerit; mixta vero cum Syrupo Violaceo ipsum post aliquot horas Viridem effecerit, & *Sublimatum* Corrosivum dissolutum præcipitaverit.

Hinc mihi primum oborta ingens admiratio Naturæ, Materiam ultra quàm credi potest dividētis; deinde spes bona inveniendi quæsitum *Phlegma*. Nec fefellit Spes; molitus enim multa nequicquam, animadverti denique 12 *Uncias* Aquæ Fontanæ evadere omnino similes Colore, Odore, Sapore, & Substantiæ modo, *Phlegmati* Sanguinis Naturali, si ejus quod dico *Salis Granum* unum cum Quadrante intra illas dissolvatur. Verum quo magis illam binorum hujusmodi *Phlegmatum* similitudinem explorarem; sumpsi utriusque moles duas perfecte æquales, quas affudi seorsim duabus æqualibus inter se molibus Tincturæ Florum Malvæ inclusis seorsim duobus Vasculis Vitreis æqualis prorsus Diaphaneitatis, Magnitudinis, & Figuræ: Tum vero utrique Tincturæ Viridis Color repentè accessit, & quidem alter

alteri adeo similis, ut nihil omnino esset, vel certè deprehendi posset, inter utrumque discriminis. Ad hæc sumpsi ejusdem utriusque *Phlegmatis* Guttas 12, quas singulas immiscui singulis 24 Guttis *Sublimati Corrosivi* dissoluti contentis item duobus Vasculis vitreis ejusdem prorsus Diaphaneitatis, Magnitudinis, & Figuræ; ecce autem ex *Sublimati Corrosivi* Guttæ omnes eodem penitus ad sensum Candore, Lacteo scil. effectæ visæ sunt, atque mox in Pulverem Candidum æqualem æqualiter Præcipitatæ. Patet igitur Luce clarius illa *Phlegmata* ita esse inter se paria, ut nihil magis; quare cum artificiale *Phlegma* unum tantum habeat *Salis Volatilis* Granum cum quadrante, Naturale 12 Unciatum tantundem quoque habet in se, nec plus, nec minus.

Quoniam verò Arte Natura rimanda est, & notis ignota investiganda, per confectum Industriâ *Spiritum* quendam subrufum aggressus ad indagandam *Salis Volatilis* Quantitatem *Spiritui* Subrufo naturali ingenitam; post multa prius frustra tentata, repetitaque Experimenta, tandem animadverti ex 27 *Granis Salis Volatilis Sanguinis* in *Drachma* una *Phlegmatis* ejus dissolutis existere Liquorem Colore, Odore, Sapore, modoque Substantiæ, penitus similem subrufo *Sanguinis* ipsius *Spiritui*, qui nihil est aliud, quàm *Phlegma* gravidum *Sale Volatili*, & propter acuminatas *Salis* ejusdem particulas, & paucum sibi admixtum *Sulphur*, asperum & graveolens, imo & idoneum ad effectus infra memorandos.

Plenam porrò, atque perfectam in omnibus inter illos duos Liquores (quorum primum Artificialem, alterum vero Naturalem *Spiritum* Subrufum appello) similitudinem probare volens, in singulas duas eorum moles æquales vitreis Scyphis contentas injeci 4 Guttas *Spiritus Vitrioli*; unde æqualis omnino ex utraque parte secuta est Fermentatio: Deinde in duos Scyphos vitreos Diaphaneitate, Magnitudine atque Figura pares, quorum uterque 20 Guttas Tincturæ Florum Malvæ continebat, utriusque Liquoris Guttas 5 instillavi; unde statim extiterunt in utraque Tinctura pulcherrimi Colores duo Virides, *Smaragdi* instar; & ita similes, ut quantumvis intentos Oculos grato Errore deciperent. Denique Guttas 6 uniuscujusque *Spirituum* eorundem in Vascula duo infudi, quorum singula 40 Guttas *Sublimati Corrosivi* dissoluti habebant; unde duo emerferunt Colores Candidi perfectè similes peractaque prorsus similis Præcipitatio in pulverem Coloris Candidi aliquantulum Rufi.

Ex jam dictis perspecta penitus, nec non explorata manet omnimoda similitudo, inter duos *Spiritus* Subrufos supra memoratos; Artificialem nempe, atque Naturalem: Quamobrem quantum una *Drachma* Artificialis *Spiritus* continet in se *Salis Volatilis Sanguinei* (continet autem *Grana* 27) tantum præcisè quælibet *Drachma Spiritus* illius Naturalis Sinu suo complectitur.

Dum perfectam Cognitionem Quantitatis *Salis*, quod *Oleum Fætidum Sanguinis* ex Alembico Vitreo distillati secum aufert, mihi comparare meditabar, peculiarem *Olei Fætid* Analysin institui. Hujus *Olei Unciam* unam cum *Unciis* tribus *Boli* siccissimi, & in Pulverem subtilissimum redacti, exactissime miscui: mixtum illud in Globulos exiguos divisum in parvam Retortam Luto munitam intrusi; eamque deinceps Retortam Cervici ejus convenientis magnitudinis.

rudinis Excipulo, ut decebat, adhibito aptatoque, in Furno Reverberii collocavi, factisque ritu solito reliquis faciendis, Igne lenissimo *Drachmam* semissem cum *Granis* 10 *Phlegmatis* limpidi à *Bolo* suppeditati primum elicui; mutatoque Excipulo, statim atque prima Gutta *Spiritus* Subrufi sese mihi in conspectum dedit, & altero in locum illius substituto, utque par erat concinnato, *Unciam* semissem cum *Drachma* semisse & *Granis* 12 *Spiritus* Subrufi, *Spiritui* Subrufo Artificiali superius memorato prorsus similis, Igne paulo Intensiore quàm antea eduxi; postmodum *Olei* Colore, modoque Substantiæ, omnimodam similitudinem habentis cum *Bile*, intra *Vesicam Felleam* naturaliter reconditâ, *Drachmas* duas & semissem cum *Granis* 21, Igne Intensissimo erui. Antequam ulterius progrediar, hęc obiter notari velim, id discriminis esse inter *Spiritum* Subrufum & *Oleum*, de quibus nunc agitur, quod *Spiritus*, utpote solum è *Phlegmate Saleque* conflatus, Ignem extinguat, ut patet dum illius Gutte quædam Carboni accenso affunduntur; *Oleum* verò quippe quod *Sulphureis* & *Salinis* tantum partibus constat, æque cito ac Pulvis Pyrius ferè accendatur, totumque in Flammam amplissimam valdeque nitidam abeat, cum primum Igni admovetur.

Demum ex *Lixivio* à me confecto è residua in fundo Vasis materia *Grana* 8 extraxi *Salis Fixi* Nigricantis, Aëris humiditatem facilè fuscipientis, & Linguam vehementer exasperantis atque pungentis, quod cum *Spiritibus Acidis* Fermentescebat, & Tincturam Florum Malvæ Viridem efficiebat. Ex jam dictis facile atque manifeste colligi potest, *Unciam* illam *Fætidæ Olei Sanguinis* cujus Analysin exactissimam instituti, 19 tantum *Grana* Terræ continere, quæ cum *Bolo* mixta remansere.

Et vero cum inter *Spiritum* Subrufum ex *Oleo Fætido Sanguinis* elicium & *Spiritum* Subrufum, tum Artificialem tum Naturalem, de quibus antea Sermonem habui, nec Colore, nec Odore, nec Sapore, nec Substantiæ modo, nec Effectibus ullis, aliquid intersit discriminis, ad firmiter credendum adducor unamquamque *Spiritus* Subrufi, de quo nunc agitur, *Drachmam*, ut & *Drachmam* quamlibet *Spiritus* Subrufi, Naturalis è *Sanguine* ipso elicit, *Grana* 27 *Salis* continere.

Quod attinet ad Quantitatem *Salis* impliciti, nexuque indissolubili copulati, cum ramosis particulis *Olei* ex *Oleo Fætido* Liquoris Humanæ Vitæ Fontis educti; hæc facilè, meo quidem iudicio, detegi potest; etenim cum hocce *Oleum* Fætores & Acrimoniâ prorsus imiteretur *Spiritum* Subrufum, qui ex eodem quo ipsemet *Oleo Fætido Sanguinis* educitur, ac præterea Tincturam Florum Malvæ eodem planè modo Viridem faciat, necessum est ut unaquæque illius *Drachma* *Grana* 27 *Salis Volatilis* intra textum suum interius recondat, quæ illud Fætores, Acrimoniâ & Quantitate illâ quâ Tincturæ Florum Malvæ Viridem tribuit Colorem, prorsus simile reddant *Spiritui* huic Subrufo, qui in Distillatione *Olei fætidæ Sanguinis* ipsi præit.

Habitâ ergo jam, planèque cognita, ex superioribus Quantitate *Salis Volatilis*, quam sive *Phlegma*, sive *Spiritus* Subrufus, sive *Oleum Fætidum Humani Sanguinis*, secum ferunt cum distillantur, nemini prorsus jam potest esse, non dicam ignota, sed ne dubia quidem, ullo modo, iusta illa Proportio Ponderis, seu Quantitatis, quæ à Natura inter ea inest corpora quibus

Sanguis

Sanguis Humanus constat; separari enim à se invicem profecto possunt, & quidem sine ulla Imminutione Substantiæ: Separavi enim ipse successu planè felici; possunt pariter semel separata ponderari, adeoque iusta singulorum Quantitas ex pondere haberi potest. Audire vero mihi videor sic fortasse Obijcientes; *Sal* extractum è *Sanguine*, ac præsertim *Volatile*, Foetidum est; retinet igitur in se *Sulphureas* multas Particulas, quarum nec Pondus, proptereaquæ nec vera potest haberi Quantitas. Hoc quidem apposite mihi Objectum fateor. Verum quod in *Sale Sanguineo* reperitur *Sulphuris*, ita exiguum est, ut nullius momenti esse videatur.

Visum præterea est hic pauca referre de Instituta, tribus circiter abhinc Annis, peractaque accuratè à me *Bilis* Analyfi. Quinta enim decima Feb. 1696, ex ea prodire coegi *Phlegma* quoddam ita limpidum, atque pellucidum, ut inter Liquida nullum magis, deinde Liquorem Lacteam instar Lactis ipsius candidum elicui, tum alia quædam Corpora, quæ hic prætereo; demum obtutibus omnium circumstantium illud expositi *Phlegma* & Aquam illam Lacteam, quæ penes me adhuc est integra, & omnis experta Corruptela, sed non jam ejusdem Candoris. Magna mihi apud meipsum de hujusmodi Aqua fuit Quæstio, eoque tandem meditando adductus sum, ut plane crederem *Chylum* ex *Bile* in Tenuibus *Intestinis* diffusà *Volatile* haurire *Sulphur* onustum *Sale Acri* similiter *Volatili* partibus suis *Salino-Acidis* ferè exuto, adeoque admodum leni; nec dubitavi asserere *Sulphure* illo *Sale Acri-Acido* lenissimo gravido ac velut condito, *Chylum* albescere, disponi ad Fermentescendum in Cavitatibus Cordis, & ad formam *Sanguinis* facilius accipiendam præparari.

Unde consequens est, *Bilem* ab *Hepate* ad *Intestinum Duodenum*, *Cholidochi* Meatus interventu, naturaliter amandatam, novum singulis diebus extra omne dubium suppeditare Fermentum *Massa Sanguinea*, quod nativis illius Fermentis (dummodò ipsa Naturalis ab Indole sua non desciverit) Vigorem inspirat, & eorum jacturas reparat; atque adeo Fermentationis Naturalis ejusdem Liquoris perennitati mirum in modum confert. Quam mentem meam, si non penitus certam, admodum certè probabilem, sequenti Experimento confirmavi. In *Drachmam* unam *Bilis* tepidæ recens e *Vesica Felle* *Verveis* extractæ & intra collum Infundibuli vitrei contentæ, *Uncias* 8 Aquæ Fontanæ imbutas exiguo *Vitrioli Spiritu* injeci; statimque aqua illa Albedinem assumpsit ferè Lacteam, majorem assumpturâ, si 4 *Salis Absynthii Grana* ipsi admiscuissem.

Postquam vero Experiendi finem feci, monui quod prius compereram, nimirum *Phlegma* quoddam, elicitedum ex Pane, quod secum aufert in Distillatione *Sal Acidum Volatile*, si quâ par est copia in *Bilem* projiciatur, Lacteam quandam soliditatem, Lacteamque Colorem accersere. Illud *Phlegma* Tincturam *Heliotropii*, & Florum *Malvæ* Rubefacit; sed, quod majus est, *Rufus* Panis ejusdem *Spiritus* cum *Sale*, tum *fixo*, tum *Volatili Sanguinis* diutius Fermentescit, quam quivis alius Fluor Acidus. Unde maximum, ne dicam inexpugnabile desumitur Argumentum dicendi magnam ex Pane, quo potissimum vescitur *Homo*, *Salis Acidi* copiam educi, quod una cum *Acido-Nitro-Aëreo* jamjam memorati Liquoris Fermentationi excitandæ, atque sustinendæ plurimum conducit.

2. Ne nobis, tuam huc transmissam *Chymicam Sanguinis Analysin* & superfructas Meditationes candidè ad Examen revocantibus, ullæ occurrant Ambages, patiaris, rogamus, ut protensum ordinatumque tuorum Experimentorum progressum in duo potissimum restringamus Problemata, quæ nostræ hujus Responsionis Scopus erunt: Quærentes scil. prius, An præter *Sal Acre, & Alkalinum, Volatile, & Fixum*, ullum *Sal Acidum*; & an qui tuâ Industriâ ab *Humano Sanguine Spiritus Acidus* elicis, eidem circulanti *Sanguini* præextiterit? Posterius verò, Num *Proportio*, quam partes *Sanguinis* à Natura inter se *Quantitatis, & Ponderis*, habent, ulla Arte ad certas Regulas reduci possit?

The Opinion of the Coll. of Physicians at Rome, concerning Dr. Vicussens's Analysis of Human Blood; by Jo. Maria Lancisi. n. 264. p. 597.

Quantum ad prioris attinet Problematis Solutionem, tecum fatemur solidum esse Errorem, *Sal Acidum* à *Sanguine* separari non posse: qui enim hoc negant, supponunt *Acidum Sanguini* non inesse: Esse autem, vel ipse docuit *Hippocrates*; & quod omni plus valet Auctoritate, multæ rationes, atque obvia plurima Experimenta apertissime convincunt. Etenim *Sal Marinum*, aliaque multigena *Salia Acida* passim cum Cibis & Potibus intra *Sanguifera* infundimus, quæ, quanquam in Statu Naturali majori ex parte dulcificata Volatilizentur per *Alkalina*, sæpe tamen fit, ut in Morbis, ad nativum Fixationis Statum restituta, secernantur à *Sanguine*, & extra Corpus deriventur sub forma *Sudoris, Salivæ, Urinæ*, aut aliorum Ichorum, ad Gustum evidentissime *Acidorum*. Neque ullus dubitationi locus esse videtur, quin *Sal Marinum*, quod inter *Acida* reponitur, Sanorum etiam *Sanguini* inexistat; si enim portio aliqua *Cruoris* è *Vena* profluentis super Talci laminam extendatur, ac sponte exsiccanda relinquatur, curiosum exhibet Spectaculum illam cernenti per *Microscopium*, duplex enim *Salis* Species occurrit, una quidem *Figura Salis Communis*, altera verò *Salis Volatilis*. Quinimo *Sanguis* in Furno exsiccatus, Ignique admotus, Flammam concipit cum Streptitu, Crepituque, *Marini Salis*, ut notat Clarissimus *Boylaus* in *Hist. S. H.* qui ad Tit. 22. ejusdem *Historiæ* pressius loquendo, scribit se valida Calcinatione tres aut 4 *Drachmas Salis Fixi Sanguinis* extraxisse, quod comperit, ut expectabat, ad instar *Marini Salis*. Jure igitur constante, vel ad Oculum, existentia *Salis Acidi* intra *Sanguinem* concludi meritò potest, idem *Sal Acidum*, obstetricante *Chymicâ*, ab eodem *Sanguine* extrahi posse. Accedit, quod cum nullus sit, vel Hospes in *Chymia*, qui *Fætidum Oleum* à *Sanguine* excludat, nullus pariter *Acidi* existentiam in *Sanguine* poterit inficiari, cum Naturalem *Olei* compositionem *Sulphureum Acidum* ingrediatur.

Lib. de Ven. Med.

Dubium solummodò quod hac super re nobis adhuc superest, illud esse videtur, an Liquidum, quod tu *Sal Acidum* particulari *Analyfi* ex *Fixo Sanguinis Sale* secerni posse demonstras, & *Spiritum Irritantem*, atque ipso *Spiritu Aceti Acidiorum* esse pronuncias, in totum atque integrè sit ex *Sanguine*? An potius aliis incurrentibus, vel admixtis in ipsa præparatione corporibus, aliquid suæ *Aciditatis* debuisse affirmandum sit? Quanquam enim nonnulli ex *Chymicis*, cæcâ quadam in Parentes fide, constantissime tueantur Ignem, in *Spagyricis Distillationibus* rebus ipsis admixtum illarum *Texturis* haud irretitum iri; Ingenuus tamen atque æque *Experientissimus Boylaus*, de *Chymica Sanguinis Analyfi* agens, aperte fateur, sibi non constare, num frequen-

Chym. Script. Hist. S. H. Part. 4.

tibus

tibus Distillationibus, particulæ quædam Ignis non possunt identidem associari particulis Distillati Liquoris. Et cum nemo sit qui ignoret, Ignem esse *Acidum Sulphureum*, nemo sane hac de re ab omni se liberare poterit suspitione, *Spiritus Acidum*, qui à *Sanguine Calcinato* mediante Igne Reverberii elevatur, aliquem saltem suarum constituentium partem Ignis Miscelæ nequaquam debere. Neque vero hujusmodi Objectum diluitur per illud, quod tu subdis tentatum Experimentum Calcinandi *Sanguinem* ad nudos *Solis Radios*; Ii enim, ut probe nosti, & Ignis sunt, & Ignem accendant. Quid! quod Cineres, post Calcinationem libero Aëri expositi, ab *Acido* ambientis *Salem* multum possunt mutuari.

Sed mittamus hæc; ponentes pro certo, quod circa Ignis apud Corpora Distillata mixtionem, & circa haustum *Acidi Spiritus* ab Aëre, nos adhuc tenet in ancipiti. Ad id veniamus, in quo omnes Chymici unanimiter consentiunt, & tu quoque Cl. Vir, in Scheda Prælo commissa publicè profiteris, viz. Terræ omnes Bolestes *Spiritu* gaudent *Acidulo*, quo fit, ut si ipsæ seorsim à quovis alio Corpore, per Retortam Distillantur, *Acidum Spiritum* de se emittunt. Quis igitur attente animadvertens modum quo tu à *Fixo Sanguinis Sale Spiritum*, *Aceti Spiritu Acidiorum* separas, maximo statim jure non suspicabitur, *Acidissimum* hunc *Spiritum* non solius *Sanguinei Salis Fixi*, sed duplæ majoris *Boli* partis, quam in Distillatione admisces, prolem habendam esse? Atque ea quidem ulteriori cum ratione qua Chymici solent ex Marino, Exempli-causa, *Sale* eo copiosiore *Acidum Spiritum* elicere quo majorem *Boli* molem eidem admiscuerunt. Adeo vera sunt, & *Boli* miscelam ad *Acidi Spiritus* productionem, ac multiplicationem plurimum conferre; & neminem certe affirmare posse, id quod à Mixtura *Fixi Sanguinis Salis* ac *Boli*, Chymicis ex Organis profuit, totum ab alterutrius Textura solummodo derivare.

Sed inquis, Vir Clarissime, si vos firmum ratumque habetis *Humano Sanguini Marinum* præ cæteris *Sal* naturaliter inesse, modum saltem ostendite, quo, citra novi corporis additamentum, *Acidus Spiritus* ab eodem elevari possit? Profecto, ne tecum tenaciores videamur nostrorum Experimentorum, quam Viris congruat ad Libertatem natis, fatemur, nos, animo revolventes, *Bolum* distillandis *Acribus Salibus* ob eam causam admisceri, ne Igne fundantur, fusaque *Spirituum* Ascensum præpediant, statim cogitasse, num *Boli* locum in extrahendo *Acido Sanguinis Spiritu*, ipsa *Damnata Sanguinis Terra*, *Salium* particulas utcumque disgregans, satis tenere posset. Quade re diligentissimus ex nostris Artifex *Franciscus Pirotti* sumpsit Fæces illas obscuras, lacidasque *Sanguinis*, quæ post Distillationem omnium partium *Volatilium* in Retortæ fundo inveniuntur, quæque Marino præsertim *Sale* sunt gravida; easque in Vitream humilioremque Retortulam solas transfudit: Ita enim, reliquis ex Arte concinnatis, spe nostra minime fuimus frustrati, nimirum Igne Reverberii famus ascendit, qui resolutus est intra Recipientis fundum in Guttulas Liquoris moderatè *Acidi*, cum aliis *Acidis* nullo modo, aut cum Alkalicis evidenter Luctantis; in qua certe Operatione dubitari non potest, quin *Acidum* quod à prædicto effluit Capite Mortuo, sit ipsius *Sanguinis Incola*, cum nullum corpus Advena, præter Ignem, eidem admixtum fuerit.

Neque

Neque idcirco in Controversiam ponimus *Acidissimum* illum, tua Industria elicitum *Spiritum*, ut superius obiter tetigimus, aliqua saltem ex parte ab ipso *Sanguine Sale* profectum fuisse. Etenim tecum sentimus, *Sal Fixum Humani Sanguinis* non esse unius simplicis Naturæ, sed Androgynum, mixtum nempe ex *Acido & Alkali*. Et quoniam ea est *Fixi Salis Alkalici* Textura, ut Igne Reverberii strictissime cohærens, Vitrificetur potius quam Atomum de se elevari sustineat, ut monet etiam *Hoffman*, exinde eadem faciliè tollitur difficultas, quæ circa Distillationem *Fixi Sanguinis Salis* minus in Chymia peritis occurrere posset; scil. unde fiat, ut ex Cinere *Humani Sanguinis*, apparenter *Alkalico*, *Acidos* tamen *Spiritus* sublimes: Partes siquidem *Salis Alkalici* Fixantur magis, & pene Vitrificantur in Retorta, dum reliquæ *Acidi Salis* particula elevationis motum acquirunt.

Alterum jam nos *Problema* sollicitat, cujus porrò Solutionem quanquam Ingenium tuum miris modis, ac repetitis Experimentis summoque Labore, tentare aggressum fuerit, nihilominus, num omnis ideo superata sit, aut superari possit *Difficultas*, maximopere dubitamus. Etenim quanquam *Proportio* partes inter Constituentes & Massam ipsam integram *Sanguinis* revera inveniat in singulis Individuis Individuam operationem, attamen unam Universalem certamque istius *Proportionis* Normam, quæ cunctis congruat singularibus *Sanguinibus*, inveniri posse, vero simile magis quam verum arbitramur. Et sane multa sunt Argumenta, nostro quidem Judicio, quæ hujusmodi *Proportionem* nobis in aperto venire posse, omnino impossibilem reddunt. Primo quidem apud omnes *Mechanicos & Arithmeticos* indubitatum est Axioma, veram *Proportionem* Ponderis Partium ad Totum, seu è converso Aggregati ad Aggregantia, haberi non posse, quin certo nobis constet Pondus Totius & Partium, seu Pondus Aggregati & Aggregantium. Sed hic, exuta quavis præoccupatione, neminem certe putamus futurum liberæ Mentis, qui non cognoscat, & fateatur, difficultatem & impossibilitatem evidentiæ istorum Ponderum. Etenim quantum spectat ad Totum nempe *Sanguinem*, quis est, qui non videat certam ac determinatam *Cruoris* mensuram eandem in omnibus haud inveniri, cum vel in singularibus ægre satis inveniatur? Quo fit, ut Scriptorum aliqui Libras *Cruoris* 8, alii 20, alii 22, alii plures, alii minores, admittant in *Homine*. Neque vero hujusmodi difficultas extrahendi verum *Sanguinis* Pondus, ulla Arte vinci potest, cum non tantum varient ac diversificentur ab invicem continentium canalium Diametri in singulis individuis: Sed quod pluris est, totus ac universus *Sanguis* ab *Homine*, etiamsi sauciatus fuerit in jugulo, exhauriri nequit, ac proinde ad Lancem venire non potest. Tot enim sunt Canaliculi Obliquitates, Viscerum Anfractus, ac præsertim tanta est Vasorum *Vena Porta* amplitudo, quæ à *Cava* ramis, toto *Hepatis* interposito aggere, distat, ut multus sit *Sanguis* qui vel in ipsis mactatis & per pedes suspensis Animalibus superest in Abdomine.

Neque vero ad Infirmandum Robur nostri Argumenti valet subterfugium, quod nempe ad obtinendam scientiam *Proportionis*, totum inter & partes, satis sit nosse particulare Pondus unius Molis, Toti similis, & nosse deinde particularia Pondera Principiorum dissimilium, sed Aggregantium unam

molem Toti similem: Scilicet quod in Casu Nostro aequè benè attingere possimus normam *Proportionis* quæ *Sanguinem* inter & sua Principia intercedit, si exactè sciverimus verum pondus alicujus saltem molis *Sanguinis*, simulque noverimus particularia Pondera dissimilium Principiorum eandem molem Aggregantium; etenim (quidquid sit de Validitate istius Hypothesis in Fluidis, certam Gravitationem Specificam habentibus) maxima difficultas versatur, in determinando vero Pondere unius molis *Sanguinis* Toti similis, & in detegenda eadem in singulis *Proportione* Principiorum dissimilium sed Aggregantium supradictam molem *Sanguinis*. Et prius quidem, quia *Specificæ* Gravitatis *Humani Sanguinis* difficilius, quam quis sibi fingit, stabiliri potest, ut ad rem nostram post *Sanctorium* scribit *Boyle*; ea enim variat eodem in *Homine*, diverso Anni & Diei tempore, vel quod majori minorive ab assumpto Cibo intervallo extractus fuerit. Quid! non etiam *Arteriosus* à *Venoso*, & *Venofus Cava* à *Venoso Porta* multo *Specificæ* Gravitatis discrimine inter se distant? Non igitur certo constare nobis potest, vel Pondus Totius *Sanguinis* in omnibus aut in singulis Hominibus, vel *Specificæ* Gravitatis cujuscunque molis ejusdem Fluidi.

Posterius vero multo adhuc minus haberi potest, aut determinari Pondus singularum Partium Aggregantium, vel universum *Sanguinem*, vel particularem ejusdem molem, quia fieri non potest quin ejusmodi Partes, seu Chymica Principia, additione novorum corporum, Igne nimirum, Bolo, aut Acre, vel detractone nativarum particularum, insensibiliter in Auras avolantium, pristinum propriumve Pondus, ac proinde veram inter se *Proportionem* admodum variant. Ex quo factum legimus, ut cum præcitatus diligentissimus *Boyle* studuisset accuratam *Humani Sanguinis* Distillationem, at tamen postquam sigillatim Extracta illinc corpora ponderasset, evidentem in iisdem multarum *Drachmarum* defectum observaverit: atque ideirco Paradoxum jure vocat, quod Chymici nobis imponere satagunt, in Distillationibus accurate factis, separata corpora ad Totius Pondus exactissimè recurrere. Neque vero dum hæc asserimus, *Boylei* aliorumque Ingenuorum Scriptorum Fidei duntaxat innitimur; tentata namque per nos etiam sedula, quantum fieri potuit, Spagyrica *Humani Sanguinis* Anatomie, separatæ partes Pondus Toti æquale minimè reddiderunt. In *Unciis* enim 7, & *Drachmis* 7, *Sanguinis*, post Distillationem plus *Semiuncia* desideratum est: Id quod proculdubio tuis etiam in Experimentis contigisse suspicamur.

Cum igitur verum neque Totius neque Partium *Sanguinis* Pondus nobis liquido constare possit, nulla pariter vera *Proportio*, quæ illa inter corpora intercedat, nobis cum spe aliqua quærenda superest.

Accedit deinde impossibilitati ex parte Artis, certum Pondus Totius & Partium *Sanguinis* attingere nequeuntis, ea impossibilitas quæ oritur ex parte Naturæ ipsius *Sanguinis*: Qui cum Indole non sit idem in singulis, frustra ab eodem *Proportionem* petimus quæ omnibus Hominibus congruat, & commensuretur. Differt enim Natura à Natura, ut aiebat *Hippocrates*; nempe juxta diversa Alimenta, Ætates, Regiones, Anni Tempestates, Sexus, Animi Pathemata, Corporis Exercitationes, ac potissimum Viscerum Structuras, ac Fermentorum Vires, diversa oriuntur in Hominibus Temperamenta, quæ

varium

varium longēque diversum in uno quam in altero *Sanguinis* Componentium excessum, aut defectum, (quod idem est ac *Proportionem* dixisse) & significant & supponunt. Exinde fit, & Hominum, tum Mores cum Morbi, tanto intervallo inter se non modo distent, sed commutentur. Neque vero multis opusest Argumentis, ad probandam facilem Variationem Componentium massam *Sanguinis*, in uno quam in altero individuo, cum, te asserente, vel unicum *Granum* cum Quadrante *Salis Volatilis Humani Sanguinis* integram *Libram* Aquæ distillatæ perturbare, & novam in eadem *Proportionem* 1 ad 11525 inducere apta fuerit. Hæc sane multorum inter *Sanguinis* Discrimina, quæ nemo sensatus inficiari potest, abundè confirmantur ex Vino & Lacte, quæ cum sint Fluida Heterogenea, & *Sanguini* admodum Analoga, à Regione, Solo, Anni tempore, atque Ætate, suis in Componentibus eo usque alterantur, ut nullam, certe Veram, *Proportionis* Regulam, quæ singulis competat, possint admittere.

Postremo enixe petimus, ut relictis generalibus Hypothesibus, sedulo perpendas expositam à te *Proportionem Drachmæ Salis Fixi* ad *Lib. 50. Sanguinis*, ex quibus *Sal* extractum fuit, (mittimus enim hic tot *Libras Cruoris* non unius, sed plurimorum Hominum, forè etiam ægrotantium, è *Venis* fluxisse, quod multum alterare potest Normam *Proportionis* Naturalis) eamque *Proportionem* compares cum illa *Scrupulorum* quinque ejusdem *Salis Fixi* ad solam *Libram* unam *Sanguinis* à laudatissimo Boyleo diligenter exposita; comperies enim mirum dictu! Non solum *Proportiones* istas non esse similes, sed ita inter se differre, ut *Proportio Boyliana Salis Fixi* ad *Sanguinem* superet fere decies *Proportionem Salis Fixi* ad *Sanguinem* per te enunciata. Quid! quod hic *Romæ Proportionem* ab utroque Vestrum longè diversam invenimus. An verò hujusce Discriminis causa referenda sit integre in diversas *Sanguinum* Indoles; an etiam in varias præparandi formas, ac vias quibus *Londini*, *Monspellii*, ac *Romæ* itum est, aliorum esto iudicium. Interea, satis nobis erit hoc non minuire Argumenti Pondus, quod utrinque validissime urget: Sive enim in diversa *Sanguinum* Temperamenta, vel una etiam in diversa Artificia refundantur Discrimina, perpetuo ipsa insuperabilis Varietas infidam reddit quæsitam à Nobis *Proportionem*.

XVI. A Child (about a Quarter of a Year old) at Littlechal in Shropshire, about Candlemas 1674 was taken with a Bleeding at the Nose and Ears, and behind the hinder Part of the Head, where there was nothing at all of any Sore. This lasted for three Days; at the end of which, the Nose and Ears ceased bleeding: But still Blood came, as it were Sweat, from the Head. Three Days before the Death of the Child, (which was the sixth Day since she began to bleed) the Blood came more violently from her Head, and streamed out to some distance from it: Nor did she bleed only there, but upon her Shoulders and at the Waste, in such Quantities, that the Linnen next her might be wrung, it was so wet; and every Day required clean Linnen. She for three Days bled also at the Toes, at the Bend of her Arms, at the Joints of her Fingers of each Hand, and at the Fingers-ends; and in such measure, that in a Quarter of an Hour the Mother hath catch'd from the

A strange kind
of Bleeding, in
a little Child;
by M. Sam. du
Gard. p. 109.
p. 193.

Droppings of the Fingers, almost so much as the Hollow of her Hand would hold. All the time of this *Bleeding*, the *Child* never cry'd vehemently, but only groan'd; though about three Weeks before, it had such a violent Fitt of *Crying*, as the Mother said she never heard. After the *Child* was dead, there appeared in those Places where the *Blood* came, little Holes like the Prickings of a Needle.

This Account I had from the Mother of the *Child*, who is a very sober Woman; and she told it me with Tears. She also told me, that the *Blood* was not thin like Water, but of that Thickness as *Blood* usually is; and that she and others believed there was little or no *Blood* left in the Body of the *Child*.

A Periodical
Evacuation of
Blood at the end
of the Fore-
Finger; by Mr.
Ash. n. 171. p.
989.

XVII. *Walter Walsb*, an Innkeeper in *Trym*, born in *Ireland*, of a temperate Diet, sanguine Complexion, and pleasant Humour, in the 43d Year of his Age, Anno 1658, about *Easter*, was seized with a great Pain over all his Right Arm; a great Heat and Redness in his Right Hand; and a Pricking in the Point of the *Fore-Finger*; whereon there appeared a small *Speck*, as if a little *Thorn* had run in: And supposing it such, he opened it, whereupon the *Blood* spun out in a violent, but small Stream. After it had spent its Violence, it would cease for a while, and only drop, and then spring out with Violence again, continuing thus for 24 Hours; till at last he fainted away, and then the *Blood* stanch'd of itself, and his Pains left him. From that time during his whole Life, (which continued twelve Years) he was frequently troubled with like Fitts; seldom having a Respite of two Months; and they never returned oftner than in three Weeks. He rarely bled less than a Pottle at a time; the oftner the Fitt came, the less he bled; and the more rarely it assaulted him, he bled the more: Whenever they endeavoured to stanch the *Blood*, it raised most exquisite Tortures in his Arm: No Remedies that were ever used, proved in the least effectual; he had no other Distemper that troubled him; neither Season nor Weather wrought upon him; he had no outward Accident that at first brought the *Bleeding*: Drinking more than ordinary, made him more apt to bleed; he had no Child after his first Seizure. These frequent Fitts brought him at last very low, insomuch that towards his latter End he bled but little, and that too but like diluted Water. He died of this Distemper on Feb. 13. 1672.

An Eruption
of Blood at the
Glandula Lachrymalis; by
Dr. Clopt. Ha-
vers. n. 208.
p. 51.

XVIII. An Icteric discontented Woman, having a Desire to die, wholly rejected the Help of Medicine, and within three Months, being well nigh her End, there happened an *Eruption* of *Blood* out of the *Glandula Lachrymalis* of one of her Eyes, without any External Injury. There was an Evacuation of *ibij.* *Blood* within the Space of 30 Hours. About a Week after, the same Sluice was opened again, and she bled till she died.

An admirable
Effence for
stanching Blood,
by M. Lenys. n.
24. p. 6039.

XIX. Here [in *France*] hath been found out an admirable *Effence*, which being applied to any *Artery* whatsoever, stops the *Blood* instantly, without any need of binding up the Wound. We first experimented it upon *Dogs*,
of

of whom I've cut the *Crunal* and *Carotid Arteries*, and the *Thigh* itself: And the *Blood* stopped in a little while; the Wound healing without any *Scar*, *Suppuration*, or *Cicatrice*. We have also made Trials upon *Men*, of whom the *Temporal Arteries* were opened; and upon others, whose *Hands* and *Face* had been cut, and it succeeded with them as well as it did upon *Dogs*.

This *Liquor* works not only outwardly, but also being taken inwardly; for it stops the Loss of *Blood* in *Fæminis*, inveterate *Fluxes* of *Blood*, open *Hæmorrhoids*, and other *Hæmorrhagies*.

XX. 1. May 30, 1673, a *Dog* had the *Skin* of his *Neck* slit open, and flea'd by Mr. *Sergeant Wiseman*, so that the *Jugular Vein* lay bare. He then with his *Lancet* opened it, and immediately apply'd to it a *Button-Pledget* of *Lint*, dipped in the *Stryptick* sent from *France*. This being done, he took up the *Muscles* on the other side of the *Throat*, and divided them till he came to the *Carotid Artery*: This he likewise opened with his *Lancet*, and apply'd a *Pledget* after the manner aforesaid. These *Pledgets* being kept on by *Pressure* of the *Thumb* about a quarter of an *Hour*, were then taken off; the *Vessels* bled, but not freely: Whereupon the *Pledgets* were changed for fresh ones, and kept on a quarter of an *Hour* more; being then first let loose, and afterwards taken off, the *Vein* and *Artery* were knit and solder'd together.

Experimente
made with this
Liquor: by Dr.
Walt. Needham.
n. 95. p. 6052.

2. The same Day a *Patient*, whom *Sergeant Wiseman* had newly dress'd with a *Caustick-Stone* in the *Neck*, (upon some *Scrophulous Swellings*) was brought back to us in a *Coach*, having bled all the Way, to the wetting almost of a whole *Sheet*. The *Vessel* lay so deep, that it was hard to reach it; however, Mr. *Wiseman* dipped two *Pledgets* in the *Liquor* aforesaid, and thrust them into the two *Orifices* whence the *Blood* came. It was immediately stopped, and the *Neck* dress'd up without any considerable *Bandage*.

3. 1. The same Day, a young *Woman's Breast* being cut off by the same *Chirurgion*, the *Arteries* were stopped by holding the like *Pledgets* in the *Mouths* of them, whilst the *Dressings* were fitted for the *Breast*. The *Pledgets* being then thrown off, the *Blood* continu'd stanch'd, and the *Mouth* of the *Arteries* remain'd close.

2. The *Woman*, whose *Breast* I cut off, May 30, 1673, labour'd under a *Cancer* ulcerated. She was weak and much indispos'd, by reason of the frequent *Bleeding* from a *Vessel* out of our reach. About 2 *Hours* after the *Account* given above by Dr. *Walter Needham*, she was taken with a *Vomiting*, and her *Breast* bled. I was sent for, and found her swooning. I took off the *Dressings*, and perceiv'd one of the *Arteries* to bleed a little. I apply'd the *French Essence* and stopped it; but doubting the ill *Consequence*, if it should bleed again in the *Night*, I secur'd that *Artery* by the *Touch* of a hot *Iron*.

By Mr. Rich.
Wiseman. Ib.

4. June 11, 1673, a *Dog's Crural Artery* was cut quite cross with an *Incision-Knife*, before the *R. Society*, by Dr. *Needham*. The *Blood* gushing out copiously, a *Lint* dipped in the same *Liquor* was apply'd to the Wound,

Wound, and held upon it a little while; when by reason of the great Glut of *Blood*, that could not be well wip'd away for want of a Sponge, (which made the Experimenter conjecture the Application had not been exactly made) the Lint was changed for a fresh one dipp'd in the *Liquor*, and kept on about half an Hour, and being then let loose, the *Blood* was soon stanch'd; whereupon the *Dog* being unbound, lick'd the Wound, and walked away without any Ligature.

By M. Denys. 5. Jun. 18, 1673; Mr. Denys himself being come to London, made another Trial before the R. Society. In the *Crural Artery* of a *Dog* was made an oblique wide Cut, and the *Liquor* in the usual manner being apply'd to it, the *Blood* was stanch'd in seven Minutes, and the *Dog* being then let loose, but yet kept quiet for 23 Minutes longer, he then arose, and let fall the apply'd Compress, and went away without any Bandage.

By ---- Ib. 6. Jun. 20, 1673, Two Calves, of the bigger Sort, were brought into the Banqueting-House by the King's Command. The *Crural Artery* of one of them being laid bare, it was cut open long-ways with a Lancet, and presently a Lint dipp'd in the said *Essence* apply'd to the Wound. The *Blood* was stopp'd in about a quarter of an Hour: But the Animal being big and strong, and striving continually to get up, the *Artery* broke out again; whereupon a fresh Lint dipp'd in this *Healing Water* was laid on again. The *Blood* was at length so stopp'd, that about the end of 2 Hours the Beast arose, walked about the House without losing any *Blood* more, though the Wound had no Bandage on it. Of the other Calf, the Butcher cut off quite one of his Legs, as high as he could, and the *Blood* rushing out impetuously, a Compress of Lint dipp'd in the *Essence* was presently apply'd to the Part. Here more Care was taken than before, of keeping the Animal quiet; and about the end of a quarter of an Hour the *Blood* was found perfectly stanch'd. Several of the King's Physicians and Chirurgeons did examine the Wounds after the *Blood* was stopp'd, and found them clear without any *Escar*: And his Majesty, who was present at these Experiments, declar'd himself publickly to be very well satisfy'd with it.

By ----- 7. The King having given Order that Mr. Denys should be desir'd to communicate the Secret, a Quantity of it was made in his Majesty's own Laboratory, of which Trials were made upon three Calves in Whitehall, Jul. 12, 1673, a Leg of each of them being cut off, as high as was possible, and the *Blood* of them stopp'd with this new *Liquor*, to the Admiration of all the Spectators: For this *Water* having been prepar'd with more Exactness than ever, the Effect of it was so quick and powerful, that the *Blood* was stopp'd in four Minutes of Time; the Calves by their Motion making the Pledgets to fall off, that had been put on the Parts cut, and not a Drop of *Blood* appearing.

By ---- n. 95. 8. 1. Jul. 1673, the Leg of a poor Woman (labouring under an inveterate Scurvy and the King's-Evil, in the Hospital of S. Thomas) was cut off, because of a Malignant Ulcer, not suffering her to sleep Day or Night. Immediately afterwards, the Arteries were dress'd with some Linnen Pledgets, dipt in the Astringent Liquor, with a Compress upon it, and a Bandage keeping

ing all close against the *Arteries*. The Success was, that the *Blood* was stanch'd without any other Dressing. And instead of complaining, as those are wont to do who have a Limb cut off, and the Mouths of whose *Arteries* are burnt with an hot Iron, or a *Caustick*, to stop the *Blood*; this Patient look'd very chearful, and was free from Pain, and slept two *Hours* after, and also the Night following, and from that time found herself still better and better, without any Return of *Bleeding*, or any ill Accident.

2. July 5, 1673, In the same *Hospital*, the Leg of a Seaman was cut off, because of a *Wound*, accompany'd with a *Fracture*, made by a Cannon Bullet. After the Part was dress'd, as above, with Linnen dipt in the *Essence*, the *Blood* was stopp'd in less than half a quarter of an Hour. There was made a Bandage, that pressed the Linnen against the cut *Arteries*; and without any other thing, the Patient found himself so eased of the Pains he felt before, that he slept two or three *Hours* after, and all the Night following.

Next Morning, the *Dressings* of the Woman, as well as the Man, were taken off in the Presence of the Physicians and Chirurgeons, who were sent by the King to see the Operations; and they all did acknowledge, that no *Wounds* could look more fair and ruddy; there appearing no *Escarr* at all, nor any more *Blood* than if there had never been any *Veins* or *Arteries* opened in that Part.

9. The *Royal Stryck* Liquor was used in the Engagement against the Dutch, 1673, by the Chirurgeons of the Earl of Ossory, Sir Edward Spragg, and Sir John Berry, and others, with admirable Success. A very good Physician in *Yarmouth*, several credible Persons also in *London* and other Places, (some of whom have taken it inwardly themselves) do give the like Commendation of it, for stopping *Bleeding* upon *Eruption*, or Apertion of a *Vessel* in the *Lungs* or other *Internal Parts*. By ----- n. 37. p. 611 &c.

XXI. 1. A large Dog being provided, an Aperture was made through the common *Integuments* of his *Abdomen*, whence the *small Guts* were extruded: After an Incision made in one of them according to its Length, they were again reduced; the *Wound* in the *Abdomen* being stich'd up, a Solution of this *Powder* was apply'd; the Dog continu'd without any ill Symptoms, and became perfectly well in a few Days after. The like Experiment I have made on another Dog, who in like manner recover'd without the Application of any Medicine. Experiments made with Mr. Colbatch's Stryck; by Mr. Will. Cowper. n. 103. p. 42.

2. The Leg of a Dog was amputated three Inches above the *Patella*; the Exence of *Blood* from the *Arteries* was great, which did partly proceed from the Unaptness of the Applications which were prepared; but after two or three Attempts, the *Flux* of *Blood* was stopp'd, and such a Bandage made use of, as was necessary only to keep on the *Dressings*: The Dog continu'd without any considerable *Flux* of *Blood*, and the next Day he was found on his three Legs.

3. The diseas'd Arm of a Man in *S. Bartholomew's Hospital* was amputated above the Elbow; but for above a quarter of an Hour's Time many successless

unsuccessful Applications of this *Styptick* were made, and at length a small Tent, dipp'd in the *Powder* itself, inserted into the Extremity of the *Bleeding Artery*, before the *Flux* of *Blood* would admitt the Application of Bandage. Five *Hours* after, a fresh *Flux* of *Blood* appear'd, and strict Bandage was apply'd. The same Morning the above-mention'd Amputation was made, a Boy about 12 or 14 Years of Age had his Leg also taken off below the Knee, to whose Stump divers unsuccessful Applications of this *Styptick* were also made, before it was bound up; and in less than an *Hour* after, a fresh *Flux* of *Blood* happen'd, and strict Bandage was added. Some *Hours* after these Operations, both these Patients suffer'd extravagant Pains. Three Days after, the Applications were taken off; and had any Person, a Stranger to what had been done, seen the Stumps, he would have suppos'd nothing less than an *Actual Cautey* had been apply'd, or could have occasion'd such large *Escarres*, and so horrid an Appearance; which did sufficiently denote this *Vulnery Powder* to be a violent *Caustick*.

Trials of *Stypticks* on the Bodies of *Quadrupedes* have been commonly practis'd, to commend them to the Publick; but it is not without Cause that Pretenders to such Remedies have made choice of younger Animals, as *Dogs* and *Calves*, &c. for that purpose. But since the only Standard of their Use is their Success on the *Humane Bodies*, we ought to make our Experiments on those Animals, whose Magnitude and Age bear a Proportion to it. For nothing is more obvious in wounding the *Arteries* of Living Animals, than that the Protrusion of their *Blood* bears a Proportion to their Bulk; and in Dissection, the *Arteries* of the *Fœtus* are remarkably thinner than those of an *Adult*; and those of *Aged* Bodies grow still thicker, and frequently become *Cartilaginous*, and at length entirely *Bony*; of which Dr. *Tyson* and myself have several Pieces.

Some Animals
having Lungs,
yet wanting the
Arterious Vein;
by Dr. Swam-
merdam. n. 94.
p. 604o.

XXII. In nuperis meis Sectionibus Animalia quædam deprehendi, quibus licet uterentur *Pulmonibus*, *Vena* tamen *Arteriosa* fuerit à Natura denegata, sic ut *Sanguis* immédiate è *Corde*, præviâ nullam in *Pulmonibus* Circulationem, aut Conquassationem passus, per totum Corpus distribueretur. Nemo enim, opinor, *Ranis Pulmones* denegabit, postquam Exercitatissimus *Malpighius* tam curiosa tamque notabilia de iis divulgavit, atque Solertissimus *Guakerus Needham* *Pulmone* manifesto eas donari atque *Respirare* annotavit: In his tamen Amphibiis *Vena Arteriosa* desideratur. Quare nec eorum *Sanguis* ullo modo per *Pulmones* circulatur, in iisve cribatur, verberatur, aut comminuitur; cum mox ex simplici eorum *Cordis Sinu* per totum Corpus, *Pulmonibus* intactis relictisque, dispescatur. Quod certe haud debile mihi Argumentum videtur, quo, inter alia, *Hepati* suum *Sanguificationis* Munus restituere aliquando conabor.

Arteria tamen manifesta (*Bronchiali*, seu potius *Pulmonali* Analoga) in *Ranarum Pulmonum* succingente tunica adest, quæ mirandum in modum, ac *Retis Mirabilis* ad instar, per eorum Superficiem tenditur, atque minutissimis suis propaginibus sensim ad interiores *Vesiculas* progreditur; ubi, (ut ego quidem arbitror) cum *Vena Pulmonali* Anastomosin patitur, etiam Oculis

Oculis manifestam. *Venosum illud Vas Arterioso duplo majus: In Pulmonum cavo, ac præcipuè in Vesicularum ejus Oris ac Limbis situm est, à quo omnibus Cellulis, imò & ipsi Tunica succingenti, Capillaribus, ac fere invisibilibus Ramusculis prospicit.*

Animalia, quæ suspicor eandem cum *Ranis Pulmonis* structuram obtinere, sunt *Bufones, Lacerta, Serpentes, Chamaeleontes, Testudines, Salamandra Aquatica, & si quæ sunt alia Pulmonibus Membranosis instructa.*

XXIII. In the Year 1685, a Servant to my Lord Culpeper got a Fall, which caus'd him a heavy Pain in the Breast for a while. About a Month after this Accident, a Musket burst in his Hands, and gave so violent a Recoil against his Right Side, that it made him spit Blood immediately, and continued for 6 Months. A Year after, he began to feel a Pulsation on that Side, and then he spit Blood again, which continued but only in the Spring and the Fall till he died. He bled likewise by the Nose twice a Year, for a Month every time. In 1695, or 1696, a Tumour began to appear under the Right Nipple, which growing by little and little, came to an extravagant Bigness, and at last, after using some Emollient Ointments upon it, (of its own accord) it broke suddenly, and he soon after died. Mr. LaFage opened the Body, and found that two of the Cartilages of the Ribs were worne off, by the continual Pulsation of the Tumour: Part of the Sternum Bone was also worne off, by the same Cause. The Dilatation of the Artery began precisely on its Trunk next to the Heart, before it divided itself into the Ascending and Descending Trunks; and tho' there is but a little Place, yet it did dilate itself so excessively, that the Bag did fill up the whole Cavity of the Thorax on the Right Side; and press'd the Lungs so much, that they were thereby much diminish'd; the Bag by the Outside did adhere to the Mediastinum, to the Diaphragma, the Plura, and to the Sternum, in which it had digg'd two great Holes, so strong was the Impulsion: The Inside of that Bag was lined, almost all over, with Bony Lamina, some larger, some lesser, like so many Shells; the Heart was mightily relaxed, insomuch that it was twice as large as it ought to be; and amongst its Fibres, there were some Stones, like them which are sometimes found in the Lungs of Scrophulous Bodies.

Fig. 63. A, The Heart. B, The Aorta, next to the Heart, where the Aneurisma began. CC, The same dilated, making the Bag of the Aneurisma. D, The Descending Aorta. E E, The two Axillary Arteries. F F, The two Carotid Arteries.

Explanation of the Figures. Fig. 63.

Fig. 64. A, The Heart. b b b, The Valvula Semilunares, in the Bag. C, The Aorta Descendens. D, The Orifice of the Aorta into the Bag. E E, The two Axillary Arteries. F, That Part of the Bag where it broke. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. The Bony Lamina in the Inside of the Bag.

Fig. 64.

Fig. 65. a a a a, The Sternum Bone. B, Its superior Part. C, Its inferior Part. D D, Its Right Side. E E, Its Left Side, in which the Cartilages of the Ribs G G, were wanting. H H, The Place of the same Bone worne off by the Aneurisma.

Fig. 65.

A Communication of the Ductus Thoracicus with the Emulgent Vein; by M. Pecquet. n. 25. p. 461.

XXIV. In the Dissection of a Woman, who died some few Days after she was brought to Bed, M. Gayant having discover'd the *Ductus Thoracicus* upon the 7th and 8th of the *Vertebra's* descending from the Back, inserted a Quill into the said *Ductus*, and having ty'd it upon the Quill, he did blow into it; whereupon the *Ductus* was fill'd with Wind from the Quill unto the *Subclavial Vein*. This Wind issued at the *Ascending Cava*, which had been cut: To prevent which, I compress'd with my Fingers the *Vena Cava* and the *Ductus Thoracicus* together; and M. Gayant having blown afresh into it, we perceiv'd that the *Emulgent Vein* was, on the Left Side, fill'd with Wind, and that thereupon the Body of the *Vena Cava* also fill'd itself from the *Emulgent* into the *Iliacues*. This Wind seem'd to us to come from the Left *Kidney*, and to insinuate itself into the *Emulgent Vein*, and thence into the *Cave*. To clear this the more, we lifted with the Hand the *Lungs*, that fill'd the Left Cavity of the *Thorax*, and having cleans'd this Cavity with a Sponge, M. Gayant did blow into the *Ductus Thoracicus*, whilst I compress'd the *Vein* and the *Ductus* with my Fingers upon the 3d *Vertebra*, descending from the Back; and we saw the Wind insinuate itself under the *Pleura*, by a Trace, which rais'd it suddenly as often as we did blow. This Trace appear'd from the 4th *Vertebra* descending into the *Diaphragm*, and made us conclude that there was under the *Pleura* a Channel of Commerce coming from the *Ductus Thoracicus*, and passing to the *Emulgent Vein* by this Cavity of the *Thorax*.

Vid. in Sect. XXV. 2. F.

This Channel of *Communication* we perceived to come from the *Ductus Thoracicus*, at the Place of the 4th *Vertebra* of the Back; but to be surer of it, I compress'd with my Fingers the *Ductus* upon the 5th descending *Vertebra* of the Back; and M. Gayant having blown into the Quill, which was upon the 7th, the Wind pass'd not to the *Kidney*, nor to the *Emulgent Vein*; which made us conclude, that the *Communication* was not beneath the 5th *Vertebra*. Then I compress'd with my Fingers the *Ductus Thoracicus* and the *Vena Cava* upon the 3d descending *Vertebra*, and the *Emulgent* swell'd, when M. Gayant blowed into the Quill: Which gave us more strongly to believe, that the Place of the *Ductus Thoracicus*, whence goes the Channel of Commerce with the *Emulgent*, was between the 3d and 5th *Vertebra* of the Back. And to be the more assured thereof, M. Gayant split the *Ductus Thoracicus* upon the 3d *Vertebra* of the Back; and having blown into it at the Quill, the Wind came out at the *Axillary Vein*, and the *Ascending Cava*; but the *Emulgent* swell'd not at all.

Blood passeth where the Air will not.

We also made the following Experiment, which seem'd very curious. M. Gayant having blown into the *Aorta*, whereof all the Branches that had been cut were ty'd up, it swell'd immediately, and the *Emulgent Artery* grew tumid at the same time: But the Wind that was protruded through the *Emulgent Artery* into the Left *Kidney*, return'd not into the *Emulgent Vein*; which taught us, that the *Blood* often passeth where the *Air* does not. For the *Blood* of the *Emulgent Artery*, which goes to the *Kidney*, returns thorough the *Emulgent Vein* into the *Vena Cava*, pursuant to the Rules of the *Circulation*.

lation of the *Blood*: But in this Experiment the *Wind* could not pass that way. And we had another Proof thereof in the *Lungs* of a Woman which we formerly dissected, where we saw, that the *Air*, which was propelled through a Quill into the *Vena Arteriosa*, which is the *Artery* of the *Lungs*, returned not through the *Arteria Venosa* (which is the *Vein* thereof) into the Left *Ventricle* of the *Heart*, though by the *Circulation* the *Blood* pass there with ease; and even *Milk*, which having been let in by this *Vena Arteriosa*, return'd easily the same way.

XXV. 1. The Discovery made about 20 Years since by M. Pecquet, of the *Ductus Thoracicus*, seem'd not sufficient to clear up all the Difficulties to be met in the new Opinion, which this Channel hath occasion'd, concerning Sanguification.

A Communication between the Ductus Thoracicus and the inferior Vena Cava, by M. Pecquet. n. 85. p. 5007.

It might be said, among other things, that there appears no Reason why Nature should carry the *Blood* into the *Sub-clavials*, and thence make it descend by the Trunk of the *Vena Cava*, (A) unless it be to keep the *Chyle* from entering all at once, and altogether pure, into the *Heart*; and that the Mixture which is made of the *Chyle* with the *Blood* along this way, may dispose the *Chyle*, by a kind of contagious *Fermentation*, the more easily to receive the Character of *Blood* in the *Heart*: But that this might be more conveniently done, the *Ductus Thoracicus* being inserted into that Trunk of the *Vena Cava* which ascends to the *Heart*, because that this Way is shorter, and is equally favourable to this Commixture.

It might also be objected, that supposing this Commixture were of Importance, the *Ductus Thoracicus* should communicate with the inferior Trunk of the *Vena Cava*, as well as with the superior, to the end that the Moiety of the *Chyle* being mix'd with the *Blood* that comes from on high, and the other Moiety with the *Blood* that comes from beneath, (B) it might the more easily be altered by this Commixture. And this Objection seem'd the more rational, because it being very likely that the *Blood*, which returns from the Parts in which it hath received some Impression in penetrating their Porosities, communicates to the *Chyle* these same Dispositions; there was Reason to desire, that the *Blood* which reascends, might in some degree impress the peculiar Character of the inferior Parts, as that which comes from the upper Parts impresses upon it that which belongs to it. (C) Add hereunto, that the *Blood* which reascends to the *Heart*, must be more perfect than that which descends; because it comes from being purify'd in the *Liver*, *Spleen*, and *Kidneys*; so that it is capable to give (D) to the *Chyle* good Impressions. (E) Lastly, it might be said, that supposing it be necessary that not only a Proportion of the *Chyle* pass through the *Heart*, to give it some kind of Refreshment, but also that all the *Chyle* be convey'd thither for to be converted into *Blood*; the small Orifices, which the *Ductus Thoracicus* hath in the *Sub-clavials*, seem not to be large enough for that purpose.

The Observations that have been lately made, by searching carefully the Passage of the *Ductus Thoracicus* in the Body of a Woman, did shew, that

these Difficulties were well grounded. For it hath been found by divers Experiments, made about this Matter, that there ascends at least so much Chyle through the Trunk which is beneath the Heart, as there descends through that which is above it.

Vid. sup. Sect.
XXIV.

These Experiments confirm those which were made some Years ago: And are clearer and ampler than the former. For the *Communication*, which the first time appear'd to be only with the *Left Emulgent Vein*, hath been found this second time not only with this *Vein*, but also with the two *Lumbary Veins*, which are inserted in the Trunk of the Inferior *Vena Cava*. The manner of finding this *Communication* was thus: After there had been shew'd the *Commerce* of the *Ductus Thoracicus* with the *Right Ventricle* of the Heart, by an Injection of *Milk*, which having been syring'd into the beginning of this Channel, issued in great quantity through this *Ventricle*; we ty'd the Trunk of the *Vena Cava* above the Heart, so that nothing might pass that way; and the Trunk of the *Emulgent* and that of the *Vena Cava* having been open'd above, long-wise, some *Milk* ready to boil was (G) injected into the *Emulgent* through the *Left Lumbary Vein*, (which we have ever observ'd to come from the *Emulgent*) and at the same time we saw it come away through the other *Lumbary*.

This Experiment having been several times repeated without our being able to see the Track, which we had formerly observed under the *Pleura*; we resolv'd to attempt a more easy, and more certain Method of discovering this Branch, than the usual Dissection of the Vessels. (H) This way was to syringe into the Trunk of the *Ductus Thoracicus* a Composition that might run into it being hot, and which by being refrigerated might become solid enough to afford a greater Facility to follow and trace the Channels, in the Cavity of which it should be thus harden'd. And this Design succeeded in part: For the Composition fill'd the whole *Ductus Thoracicus*, and ascended as far as into the *Sub-clavial*; but there pass'd nothing into the Channel that makes the *Communication* sought for, though Care was had to warm the ambient Parts by several Injections of warm *Milk*, to the end that the Composition might not harden before it had penetrated into all the Conduits. We also tried to inject the same Composition through the *Lumbary* that issues out of the Trunk, if its *Valves* would permitt it; but they stopp'd all that we endeavour'd to make pass that way, and neither the *Milk* nor the *Wind* would ever enter there. (I) By this Contrivance, we very distinctly saw the Figure and the whole Structure of the *Ductus Thoracicus*, and we found, that that *Ductus* did ascend unto the Right Side of the Heart, keeping one and the same Size, which was no more than $\frac{1}{11}$ of an Inch; that afterwards it was enlarged to $\frac{1}{2}$ of an Inch in Diameter; that in this Enlargement its Tunicle on the Right Side of the *Vertebra* was, as 'twere, pierced by 4 small Holes, distant $\frac{1}{11}$ of an Inch from one another, and all disposed in a Row: Into which Holes the said Composition had not been able to penetrate; that the same *Ductus*, after having re-taken its first Size, had two Appendixes fashion'd like Sacks; that there was yet a 3d Appendix beneath the Dilatation; that the first and highest Appendix was of the

Form.

Form and Bigness of a small *Phascolus*; that the 3d, which was beneath the Dilatation, was like to the 2d; that they had a streight Orifice; and that the last was full of *Chyle* conspissate, so that the Composition could not enter there, as it had done into the other.

2. A, This Reason for inserting of the Trunk of the *Ductus Thoracicus* into one Place alone, is as good as any that are afterwards given to prove the contrary. For all Proofs of this Nature are but loose Conjectures at best; the Matter admitting of no other Demonstration than what is *Ocular*.

Annotations
by Dr. Need-
ham y. lb.

B, Till the Lower Insertion be shewed, we are bound to believe, that Nature thought the single Commixture of *Blood* and *Chyle* sufficient. The Reinforcement of that Objection answers itself, being proposed in no other Terms than (*it seems very likely*;) the whole Conjecture having yet but very slender Foundation in Philosophy. And if there be any thing in the Notion of impressing *Characters*, it is more attributable to the *Lympha*. See beneath at D.

C, That the *Blood* which re-ascends to the *Heart*, is purer than what descends from the *Head*, &c. is a Notion that will not easily be granted; neither can it be made out by Experiment. I had myself compared the *Blood* of the *Jugular Vein* with that of the *Crural* in a Dog, and found no Difference. The Separations made by the *Kidneys* and *Livor* (if they prove any thing) prove the Ascending *Blood* to be thicker than the Descending; it having lost in those Places much of its *Serum* and *Lixivial Salts*, which are the great Instruments of Attenuation. But withall it is to be consider'd, that the *Blood* which ascends from the *Heart* to the *Head*, parts with much Excrement in the *Glandula Salivales*, and *Nostrils*, and the whole Throat; the Quantities of which are much greater than will easily be imagined. There is likewise a great Separation made in the *Brain*; which whether it be of the purest and best *Spirits* of the *Blood*, so as to leave it depauperated, or only of a *Nutritious Serum*, such as is made in all the solid Parts, is hard to say. Only this may be certainly said, that the *Lympha* does wholly exonerate itself into the *Sub-clavial* and *Jugular Veins* near the Place of the Insertion of the *Chyle*; whereby the whole *Chyle* is diluted, and the Mixture of it and the *Blood* facilitated. Which very *Phænomenon* is a greater Argument to prove, that the *Chyle* does wholly enter by that Passage, than any can be produced on the other side. For we see all the *Lympha*, not only of the *Livor* and *Intestines*, but also of the *Lower Limbs*, to pour itself into the *Receptaculum Chyli*, and not into any of the *Lower Veins*: Whereas the *Lymphaticks* of the *Head*, *Neck* and *Arms*, think it sufficient to meet the *Chyle* at the Place of its Entrance; which same thing might have been done by the *Lower Lymphaticks*, had they any *Chyle* to meet: The principal Use of the *Lympha* seeming to be, to serve the Uses of the *Chyle* and its Mixture with the *Blood*.

D, What Impressions are made on the *Blood* by the *Livor*, *Spleen*, *Kidneys*, &c. is uncertain; but if there be any such made, the *Livor* and *Kidneys* do so readily exonerate themselves into the *Vena Cava*, that the Impressions, be they

they what they will; are quickly conveyed to the *Heart* without any great Diminution of them. And whereasthe Author mentions the *Characters* impressed from Parts, those (if any such be) may more justly be supposed to be conveyed in the *Lympha*, which Liquor seems to be a Product of those Parts curiously elaborated in the very Substance of them.

E, What is sufficient and not sufficient, must be judged of by Nature, and not by us. Yet if we consider the Time that is spent in carrying the *Chyle* up into the *Blood*, it is easy to believe, that a much greater Quantity of Liquor may be discharged by that *Ductus*, than is usually pretended to.

Vid. sup. Sect.
XXIV.

F. What those Experiments are, we should be glad to know. But the Experiment of 1667, (if I rightly remember it) was only a *Lusus Naturæ*, found by M. *Pecquet*; which I therefore call so, because neither he, nor any one else hath found it since. Whereas the *Vasa Lactea*, and the Ways of ordering them, are so well known, that if any such thing were, it could not long be hid.

G, An Injection into the *Lumbary Vein*, with its Effects mentioned, can prove nothing but the *Inosculatio* of the two *Lumbary Veins* with each other; which is acknowledged to be such in all the *Capillary Vessels* of the same kind, viz. *Veins* with *Veins*, and *Arteries* with *Arteries*. But the thing required here is, the Passage from the *Receptaculum* to the *Lumbary Vein*, or to any other *Vein* besides the *Subclavial*.

H, The Way of Syringing a Liquor, which is apt to *Coagulation*, into the *Ductus Thoracicus*, &c. I think to be needless and unprofitable as to this Enquiry, when there is a more easy Experiment to be made, which is more demonstrative, viz. Open a Dog at a convenient Distance of time from his Feeding, and then tie a Ligature upon the *Ductus Thoracicus* nigh the *Subclavial*; your *Receptaculum Chyli* will continue full 48 Hours, or longer if you please: So that if there be any such *Ductus*, it must remain likewise full with its own natural Liquor, and be all that while visible. But if there were any such *Ductus*, it would in a quarter of the Time empty the whole *Receptacle*; whereas upon a Ligature you'll find the clean contrary, viz. all the *Lacteal Vessels* (that are acknowledged to be such) fully distended: Which is a full Demonstration, that they have no Way of Evacuation by any other *Duct* than the *Thoracique*.

I, The other Use of the *Coagulating Injection* I applaud; though the same may be done by the Ligature abovesaid. However, the Event of the Experiment, made by the Learned *Pecquet*, makes against the Opinion of a *New Ductus*, and not for it.

The true Use
of the Lymphatick
Vessels; by
M. Louy de
Bills. n. 40. p.
791.

XXVI. The *Lymphatick Vessels* have two Coats, betwixt which there are innumerable very small and very fine Filaments, resembling the Moss of Trees, without any *Valves*, containing a *Nutritious Juice* conveyed into all the Parts of the Body, by a Motion thereof from the Center to the Circumference; but returning through the inner Pipes (furnished with *Valves*) of the same *Water-Vessels*; at which time it is no more to be called *Water* or *Dew*, but *Ferment*, the Vessels also deserving the Name of *Ferment-Vessels*.

This

This *Ferment* serves to keep the *Blood*, and to ferment the same, being conveyed into it by a Motion contrary to the former, viz. from the Circumference to the Center; which I have shewed to many in the *Jugular Glandules* taken out of a Dog; wherein I shewed them, that these *Lymphatick Vessels* carry their *Dewy Particles* about the *Glandules*, between the two *Tunics*; and that in the lowermost End of these *Glandules* the *Ferment-Vessel* takes its Beginning, being enclosed in these *Dewy Vessels*, and so constituting the inner Pipe together with the *Valves*, which are of another Form than hath been known hitherto.

To your *Quære*, Whether the said *Ferment-Vessels* discharge at last all their *Ferment* into the *Ductus Thoracicus*, thence to be carried directly into the *Heart*, there to increase and to ferment the *Blood*; or whether they communicate their *Ferment* to other Parts also? I answer, that most of the Juice of the *Milky Vessels* is discharged between the *Tunics* of the *Veins*, *Arteries*, *Lymphatics*, *Membranes*, and the *Vessels* in the *Mesentery*, to be conveyed into all the Parts of the Body, both Internal and External. For even in *Bearing Females*, the *Fruit* is not nourished by any *Blood*, but by the *Nutritious Juice* conveyed to it; as also by the *Moisture* contained in the *Amnion*, which is no *Urine* nor *Sweat*, as some imagine; we having lately seen in the House of Dr. *Salpart* at the *Hague*, in a new-born *Child*, that his *Urachus* had no Cavity at all, through which the *Urine* could pass out of the *Bladder* into the *Amnion*. The remaining and least Part of the *Liquor* of the *Milky Vessels* is transmitted through the *Ductus Thoracicus* by the *Jugular Vein* into the *Blood*.

Besides these *Vessels*, there are yet others that do not exonerate themselves into the *Blood*, viz. the *Ductus Virsungianus*, which delivers itself into the *Duodenum*; and the *Ductus Salivales*, whereof the *Saliva* does no less, than the Juice in the *Ductus Virsungianus*, serve for *Ferment*, viz. the one in the *Stomach*, and the other in the *Intestines*. From whence you may easily conclude, not that I hold (as it seems I have been understood) that the least Part in the *Ferment-Vessels* concurs to the making of *Blood*, but that the least Part of the Juice in the *Milky Vessels* is discharged into the *Blood*.

Concerning the other *Quære*, Whether also the Distribution of this *Ferment* is made through the *Testicles*, *Kidneys*, *Breasts*, and *Salival Glandules*? &c. I answer, That the *Salival Glandules* carry their *Spittle* or *Ferment* into the Mouth; and that the rest, which returns back through the *Testicles*, *Breasts*, and other *Glandules*, is carried to the *Cistern*.

XXVII. Vir erat quasi 35 Annorum, Robustus, Temperamenti Biliosi, qui Decimis colligendis eo tempore occupatus, post Operam Laboriosiore Poros forsan cito nimis ex Rigore admissio occluserat. Prima ergo Morbi invasione Febrificavit, primo, Rigore & Horrore, dein Calore; & Doloribus vagis, (nunc in Ventriculo & Intestinis, mox in Pectore sævientibus) correptus. Verum hæc Symptomata cum aliis brevi permutantur, Materia enim Morbum committens se in Dorso omnem deposuit: Hinc immanis Lumborum Dolor ad Coxendicem usque sæviens; Et quidem tantus erat Dolor, ut sudores.

Sympto-

A Convulsive Rheumatism, by Dr. Rob. Pitt. n. 208. p. 78.

Symptomaticos sic expresse-rit, ut à Capillis & Facie Guttæ catervatim stillarent. Præ *Dolore* neque in Lecto procumbere, nec erectus stare, nec in Sedili federe potuit: Verum *Abdomine* ad Spondam Pedum fulcris protruso, *D. lo-rem Lumborum* compressione illà aliquo modo fallere videbatur. Sed neque sic inclinato Corpore quietus (ut voluit) perstare usque potuit: Sed *Convulsionibus* correptus primò erigebatur, cum Vultu miserabili, & ringenti Ore, dein in Humum retorquebatur (nisi adstaret aliquis qui Casum ejus præveniret) ubi immotus Cadaveris instar manebat, sese movere inhabilis, neque majori ad surgendum potentiâ donatus, quam si esset Infans. Brachia etiam & Cru-
ra ei prostrato rige-
bant, ut nullo modo extendi retrahive possent. Os etiam *Convulsionibus* ita claudebatur, ut Cochleare vix admitteret. *Convulsiones* autem illæ quibus Membra & Dorsum corripiebantur, per *Paroxysmos* redibant; non quidem Periodicos, sed nunc citius nunc serius redeuntes prout *Dolor* magis minusve faviret. Sed eum ad positionem suam optatam, Spondam sc. reducamus, ubi Vultu ita erat Composito, qui Risum sane cuiquam videnti facile moveret, nisi Recordatio earum quas sustinebat miseriarum Misericordiam potius excitaret. Sic autem Dies Noctesque Misellus Homo tres plus minus Septimanas transigebat, nunquam in Lecto discumbens, Insomnis ut plurimum cum *Dolore* summo, crebrisque *Convulsionibus*. Hæc sunt quæ in eo observare potui *Symptomata*; cætera sanus. Nulla erat *Vomitutio*, Pulsus fortis & æqualis; Lingua humida, & Pellicula albâ obducta; Sanguis per Venæ-Sectionem eductus, Sanguini *Pleuriticorum* similis: Urina ut Sanorum. Quid per primam septimanam factum sit, nescio; nisi quod Vena semel per-tunderetur; semel Clyster, & semel purgans Medicamentum administraren-tur; & Vis satis magna *Laudani* sine Fructu exhiberetur. Sed incassum hæc omnia. Tandem me accersi curant, qui cum Ægrum vidissem eo quo scripsi modo laborantem, *Venæ-Sectionem* repeti jubeo ad satis largam Quantitatem. Die proximo *Lenitivum* præscripsi, quod dum per sedem ad 3, 4^{te} Vices ope-rabatur, Æger *Rectus* obambulare potuit, nullis *Doloribus*, nec *Convulsionibus* laceffit; quo tandem suo munere perfuncto, redeunt statim *Dolores* & *Convulsiones*, & ipse ad pristinam suam stationem, Spondam sc. redit. Hoc ta-men Animos addidit, *Purgationes* repetitas rem ipsam expedire posse, cum pri-mum *Purgans* eas à Morbo Inducias daret. Die ergo sequenti *Resinam Jalapii* & *Mercurium dulcem* exhibui (cum expertus essem quid in *Lumborum Dolore* valeret hoc Medicamentum) sed præter Spem, ne semel quidem deposuit Æger, quanquam ʒj. Syr. è *Spin. Cervinâ* adjecerim. Ut ergo duro huic nodo durum satis adaptarem Cuneum, *Purgantium* Dosis auxi, Syr. è *Spin. Cervin*, ad ʒiij. ʒiiijve alternis diebus adhibens. Sic tandem alvus aperta est, & *Dolores* mitigare, & *Convulsiones* non ita crebo laceffere. *Serum Lactis* ut ad libitum hauriret permisi: Et cum Alvus *Purgantibus* respondere, *Lau-danum* tutius & liberius exhibere potui, unde Requiem Spiritibus, à Mor-bo simul & Medicamentis exagitatis, conciliarem; nec tamen Materiam Mor-bum committentem ab eo incarcerarem. Sic tandem factum est, ut à repeti-tis his *Purgantibus*, octo puto, aut decem, evanuit *Dolor*, & *Convulsiones* ces-sarunt, & ipse fartus tectus valet. Ego interim ut à *Recidiva* caverem, Ner-vina Medicamenta, quæ Sanguini & Spiritibus Vigorem imprimerent, adhi-bens;

bens; Eum vegetum vividumque & Onera Humeris sustinentem, nuper vidi. E memoria fere excidebat, Suras ei convalescenti intumuisse, qui Tumor his ultimis Medicamentis facile cessit.

XXVIII. Dr. Baynard was always of Opinion, that the Pains in a Rheumatism were not caused from any Saline or Acid Particles in the Blood, &c. but rather from the Clamminess and Density extending the Channels through which it passes; which Extension produces those sharp and pungent Pains, which Rheumatick Persons so generally complain of. For although the proper Coats of the Veins and Arteries seem to be Indolent in themselves, yet those thin Membranes which oblide them are of most exquisite Sense, and full of Lympha-duets, which being dilated and stretched, cause an Inflammatory Symptomatical Fever, with continual Sweats; the Blood being Glutinous and Sisy, as in Quinsies and Pleurifies, and all other Inflammatory Distempers: The Fever being increased by the great Store of Alkalial Corrosive Salts lodging in the Blood, causing Thirst, &c. and not diluted and washed off by Urine, which Urine is always thick, turbid, and high-coloured, and almost, if not totally, devoid of any Saline Impregnations. To prove which, he sent six Quarts of a strong Man's Urine, in the Height of a Rheumatism, to that Ingenious Artist Mr. George Mout, who chymically anatomiz'd it, and found not above the 30th Part of those Salts, usually found in such a Quantity of the Urine of a Sound Person.

The probable Cause of the Pain in Rheumatism, by Dr. Edward Baynard. n. 215. p. 19.

XXIX. Sit AB, Cylinder aeneus Concavus, idoneæ Crassitudinis, cuius Diameter sit unius, Longitudo vero decem aut 12 Unciarum; parsque interna exquisitissime lavigata, ut nimirum nulla Rimula remaneat; sitque ei prope fundum, parvulum Foramen O; porro sit Operculum EF, (Fig. 67.) Fundus GH, (Fig. 68.) illud duabus Cochleis, hic Cemento Metallico Cylindro nexus; adsit Fundo Nasus 1, 2, medio perforatus, & ejusdem parti externa, ad modum Cochleæ, fiat Virga ferrea NN, (Fig. 69.) idoneæ Crassitudinis, & Longitudini Cylindri adaptata; ad ejusdem extremitatem Lamina Anea LM, & propinquius duabus Unciis Cacumini altera IK; spatiumque intermedium ita Filis Linteis Oleo madefactis replendum est, ut perfectissime cavitatem Cylindri claudat; adsit tandem Manubrium N. Ex his partibus complexum haud dissimile est Syringe Chyrurgorum. Formetur etiam Cylinder Aeneus OP, QR, (Fig. 70.) magnitudinem Figuræ adæquans, duabis Alis OS, PS, per Axem perforatus tam magno foramine, ut ejusdem pars interna formâ Cochleæ Fœminæ modificata, accurate Cochleam Marem Nasi recipiat; porro augeatur Foramen ab R, & Q, usque ad TT; tandemque fiat Humerus VV, & formetur Lamina W, medio perforata, ut ei (Humeri) conveniat & adhæreat. Porro formetur Conulus rectus, per Axem perforatus 1, 2, 3. (Fig. 71.) augeaturque foramen ab 1, 2, usque ad 4, 4; formeturque Humerus 5, 5, ut exquisitissime conveniat cavitati Cylindri T, T, & ei strenuè adhæreat fiatque tandem Elater (Fig. 72.) ex filo Aneo Helicis formâ circa Cylindrum, idoneæ Viris, & Fixidis 4, 4, V, V, Diametrum fere adæquans, sed Fixide aliquanto altius, cum sibi relinquitur, Vol. III. M m

The Pneumatick Engine applied to Cupping-Glasses; by Mr. Tho. Lushkin. n. 255. p. 288. n. 259. p. 408. Fig. 66. Fig. 67. Fig. 68. Fig. 69.

Fig. 70.

Fig. 71.

Fig. 72.

habeat

Fig. 73.

Fig. 74.

Fig. 75.

habeat ad extremitatem infimam Laminam 7, 6, ejusdem magnitudinis, cujus pars infima Corio molli Oleo armato vestienda est, ad occludendum Orificium Canalis. Iterum fiat ad Verticem *Cucurbitula*, (Fig. 73.) perforatio rotunda quâ immergatur Conus usque ad Alas SS; & Rimulæ aut Fissuræ repleantur Cemento, ex Resina Terebinthinâ & Calce composito. Tandemque fiat Operculum 6, 7, 6, 7, (Fig. 74.) ad Humerum 7, 7, Corio Oleo madefacto vestitum, quo Aër quam primum ex Vitro haustus erit (si Fissuræ utut parvulæ Valvula fortè remanebunt) excludi potest. Hucusque in ejusdem Descriptione tempus trivi: nunc non de Usu & ad Morbosos Applicatione, quia Medicorum & Chirurgorum est; sed Usus ratione, pauca subnectam. Cum Pollex strenuè applicatur ad Foramen, & Lamina 9, 9, (Fig. 75.) Manubrio attollitur ad 10, 10; at quia Aër antea tantum spatium 9, 0, 9, replevit, nunc ita Rarefactus aut Expansus est ut spatium 9, 9, 10, 10, (hoc est tricenties majus) occupat, quapropter Aëris Vitro inclusi Elasticitas, Elasticitates Elateris & Aëris Cilindro contenti superans, sursum obtrudetur Lamina, aut Valvula, quæ aperta remanebit donec tanta Quantitas Aëris petir Cilindrum ex Vitro, ut complementi Aëris Vitro Elasticitas fiat æqualis Elasticitatibus Elateris & Aëris nunc Cilindro contenti; ac aperto Foramine 0, Aëris externi pressurâ potenter occluditur valvula. Cæteris paribus, & tribus quatuorve Suctionibus plus minusve 1²²² Aëris (secundum Elateris potestatem; & rationem quam habet Capacitas Cilindri ad Capacitatem *Cucurbitula*) exhaustæ erunt: Et si Elasticitas Aëris eodem spatio sit ut Quantitas, Resistentia aut Pressura sub Vitro erit ad pressuram supra partes circumjacentes, ut Unitas ad mille; quia antequam Aër exhaustus erat Vitro, Resistentia aut Pressura sub Vitro eadem fuit cum illa supra partes extra Vitrum. Notatu dignum existimo, ut quanto major erit Cylinder eodem Elatere, tanto major Aëris Quantitas exhausta erit Vitro; quia Aër 9, 0, 9, in majus spatium extenditur, & consequenter minorem habet Elasticitatem; quapropter majorem habebit, rationem Elasticitas Aëris in Vitro ad Elasticitatem Aëris in Cilindro & Elatere contenti, itaque major Aëris Quantitas Vitro extrudetur.

The Operation
of a Blister
when it cures a
Fever, by Dr.
Will. Cock-
burn. n. 252.
p. 161.

XXX. There is hardly any one who has not seen a *Blistering Plaster*, the great Ingredient whereof are *Cantharides*, laid upon a fleshy Part, and after some time, observed the *Scarf-Skin* forced up with a Liquor that oozed and issued out from within the Sphere of Activity of that Plaster: And if we consult the most of *Physick Books*, the Account is no better. Little or nothing more is said, even by Authors of the first Form, than any one may observe every Day; supposing only that he thinks that our Flesh, thus covered at any time with a *Blister*, is made up of many and divers Vessels, out of which the discharged Water may come. I have therefore endeavoured to find a reasonable Account; how the raising of a *Blister* may cure a *Fever*, and its most terrible Symptom the *Delirium*, and that in 6, 8, or 10 Hours.

To this end, I first employed *Microscopes* to look on the *Fly*, and its Powder; and to see if I could discover any sharp Instruments in these Warlike and Wounding Creatures. But the *Fly* became a very delightful, but too large a Survey

Survey for me; and the Powder begot nothing for my Sight but a dark Cloud; and whatsoever else I found, I could meet with no *Arms*. I then turn'd half a Pound of *Cantharides* into a *Retort*, and there came over with the least Sand-heat, and in a very short time, vast Quantities of Bodies so very small, that I was not able to discern their Shape. And though I proceeded in the usual Way, on the like Occasions, the whole Operation was perform'd very soon, and so hastily, that very little Salt stuck to the Neck of the *Retort*, and the *Volatile Salt* shot in most delightful *Crystals* in the *Receiver*. And of the whole eight Ounces of *Cantharides*, there were only two Ounces and five Drams left as a *Caput Mortuum* in the *Retort*. When the *Liquor* came to be purified, the smallest Heat brought it over suddenly, *Oil*, *Salt* and *Spirit*; so that they could not be parted, till by a repeated Operation with *Brick-Dust*. I mix'd the *Spirit* with *Salt* of *Wormwood*, *Spirit* of *Harts-Horn* and *Sal-Armoniack*: But it did not ferment, contrary to the Expectation of most Authors. Then I turn'd it over upon *Spirit* of *Vitriol*, where it did ferment very strongly, and yet better with *Spirit* of *Nitre*; with which also I did mix the *Spirits* of *Sal-Armoniack* and *Harts-Horn*; but they neither fermented so long, nor with so great an *Ebullition*: From whence 'tis evident, that it is not only *Alkaline*, but a great deal more than any one of these I have now mentioned.

The *Internal Use* of these *Flies* in Physick, having been lately controverted with much Heat, I shall here give some *Hints* whereby to state the Question fairly; and such, as if used as *Topicks* in the Controversy, will soon put an end to it among thinking and sober People. The great thing challenged is this, that we may see *Cantharides*, which have been reputed *Poison*, now so corrected, that they become not only Innocent, but prodigious Instruments of Health. For the clearing of this, first settle what a *Poison* is; and next, since *Death*, or no *Circulation* of the *Blood*, is its Consequence, we must find as many Kinds of *Poison*, and Ways of *Dying* natural, as there are Ways of stopping the *Blood's Motion* in the Course of Nature or by Medicine; which is either by its own *Rarefaction* to a Degree, its *Coagulation*, or, lastly, by letting it out in such a Quantity, that the remaining Part gives not Animal *Actions*: And as all, or any of these, may be sudden, or produce their Effects in Time, we shall have *Evident Poisoning*, or *Poisoning* for a Time; Of which we have many Histories. Again, it may be ask'd, of which of all those *Cantharides* are? And of all, I believe they may be found entirely or most especially of the 3d Sort. After this, we shall be led naturally to enquire, if they be corrected, or, in plain *English*, if they have left their *Wounding Power*; and this is the Fact, of which we may inform ourselves, by applying a *Plaster* of *Cantharides* so corrected to a Place exposed to Air. This will settle the Fact of *Correction*, and in Circumstances much to the Advantage of the *Correcting Side*, because there the *Skin* and *Vessels* are much harder than those to be met with within the Body; and if they blister then, much more when *Internally* given. The Possibility of their being corrected, and of their becoming useful, may not be doubted of: But then it is our Reason, in this Way, that must be Judge. Add to all this the common Obser-

vation, that a common *Blister* sometimes makes *Bloody-Urine*, and compute what Quantities enter the *Plaister*; and then what Quantities of small Parts may be sent from them that are thus mix'd; next calculate what probable Distribution may be made of these Parts to the *Kidney*; and then you'll find that Parts that are nearer, and as susceptible, must be wounded too, and produce all the ill Effects that are supposed, and commonly seen. But if all this can happen by so small a Quantity of the *Powder* that goes to the *Plaister*, and is confined by other *Viscid* Ingredients of it, what must be the Consequence of this *Powder* when it is taken inwardly, and in Substance? But it is corrected; and we are told with *Camphire*: The most unfit *Corrector*, so far as I can expect in Reason, or even imagine; but still our Reason may be frail; and so it may, and really is so, to a great Degree. But then to help it, I had two *Plaisters* applied, each of them with *Cantharides*, and one of them with as much *Camphire* as *Cantharides*. The next Morning, we found that *Plaister* wherein the *Cantharides* were mix'd with *Camphire*, to have quite as good Effects as the other where there was none. The Consequence of which is, that if *Cantharides*, said to be corrected, make a *Blister*, when applied to any External Part of the Body, that they are to be thought not to be corrected.

But leaving these Particulars, I shall proceed to prove the Way of a *Blister's* working when it cures a *Delirium*, and a *Fever*. And here I shall only suppose,

1. That there are very *Mobile* or *Volatile* Parts in *Cantharides*, &c. that can be determined into our *Flesh*, with a Force sufficient to make their Way through the Sides of any *Vessels* that are in the *Lines* of their *Direction*, so long and in that Proportion that their *Impressed Motion* does continue.

2. That all Sorts of *Fluid Bodies* contained in the Cavities and Channels of these *Vessels*, may be transmitted according to the Conditions of Separation of *Fluid Bodies* running in *Vessels* of that sort, and the Wideness of the *Emissaries* made by the *Wounding* Particles of *Cantharides*, or any such like *Blistering* Substance.

Next, I should proceed to make some Suppositions, from the Nature of a *Fever* and a *Delirium*: But that I may be better understood, I shall first hint some general things about them.

Fevers in respect of time, either remain after the same manner, from the Sickening till the sick Person is freed of his Disease, or not: If the first, they are called *Continual Fevers*; but if the sick Person continues evidently in a sickly Way, and yet has great Reliefs, and is respited from his Illness for a time, the *Fever* is said to *Intermit*, or that it is *Intermitting*. These Diseases are perfectly well discovered by the *Quickness* of the *Pulse*, which is the Fault of the *Pulse*; and the *Pulse* cannot be so but by the *Faultiness* of the *Blood*, either in *Quantity*, *Quality*, or its *Motion*: Neither can it offend either in *Quantity*, or in *Quality*, but it affects its *Motion*. Hence we may suppose that a *Fever* is an universal heighten'd *Circulation* of the *Blood*; and that a *Delirium*, *b. e.* that unconnected, incoherent, and ridiculous way of Imagination and expressing ourselves in a *Fever*, is entirely the Effect of this greater *Motion*. These

These things being supposed, the Question may be stated thus: How *Wounding* by *Cantharides* makes our *Pulse* not so *quick*, and consequently our *Blood* to have a more slow and natural *Motion*? That this great *Effect* does not proceed from the *Pain* of a *Blister*, is evident; because *Pain* very often brings a *Fever*. That the Particles of the *Cantharides*, mix'd with the *Blood*, should induce this Quiet by a peculiar Sort of *Fermentation* they make in the *Blood*, is very precarious; for I have shewn in another Place, from Hints of an eminent *Member* of the *Royal Society*, and perhaps the greatest *Chymist* that ever lived, that there is no such thing as a *Chymical Fermentation* in our *Blood*. And the Quantity of *Lympha* that is thereby separated from the *Blood*, is acknowledg'd by most Physicians to be too weak a Cause for so great an *Effect*. I shall therefore proceed to enquire after a better *Solution* of this astonishing *Phænomenon*.

The *Pulse* is nothing but the Side of an *Artery* that is distended by a certain Quantity of *Blood* that is determined through its Cavity, by a certain *Motion* every time the *Heart* is contracted, and that touches and beats up our Finger, when we lay it on a Place where we may be sensible of this Affection in the *Artery*. We say this *Pulse* is more frequent, not so much that it beats *finer* than any other body's, but that it beats *quicker* in the same Person when he is said to have a *Fever* than before, when he was reputed to be in perfect *Health*; so that a Physician is obliged to know the *Natural Pulse* of every Person, before he can judge by the *Pulse*, that any one is *sick*. And how that may be done, I have shew'd at length in a Book some time ago. Howsoever, in this our Case, the *Pulse* is *quicker*, and there is no *Pulse* but when the *Heart* is contracted; and the *Heart* being a *Muscle*, and contracted at every *Pulse*, is either the chief or only Cause that determines and stretches the Sides of *Arteries*, and makes a *Pulse*, or a very extraordinary Measure of such *Distensions*: But it has the greatest Share in propelling the *Blood* round the whole Body, in respect of the *Help* of the *Arteries*, which they are supposed to give by their *Restitution*, after their extraordinary *Distension*. Be it how it will, both their Actions are by *Contraction*; (tho' afterwards I take no notice of that of the *Arteries*) and no *Contraction* in *Muscles* was ever supposed by any sober Man to be perform'd, but by an Influx of *Spirits* into the Fibres of the *Muscles* so contracted. So that now our Question changes thus, How *Wounding* by *Cantharides* makes the *Contraction* of our *Heart* weaker?

The *Contraction* of *Muscles*, and consequently of the *Heart*, being by the *Spirits* that flow into them, as I have said before; therefore whatsoever weakens the *Contraction* of any *Muscle*, (suppose the *Heart*) must either be such a thing that can hinder the *Separation* of these *Spirits*, or intercept them in their Channel of *Conveyance* to that *Muscle*, after they are separated. The *Spirits* are known, by *Anatomical Experiments*, to be separated from the *Blood* in the *Brain*. Now, whatsoever hinders the *Separation* of the *Spirits* from the *Blood*, must either hinder that *Rarefaction* of the *Blood*, that comes by being broke down into small Parts, and makes them *Spirits* in their proper Place, or the *Blood* of that Fineness that is necessary for it to be perspired; *b. e.* a Body that affects the *Blood*, so as not to *separate Spirits*, must be

be of a Nature to make its Parts more compact in their Contact; to have their Contact with a greater Nisus, and consequently to have its Parts less separable. The next way is by affecting its Motion, so that it discharges great Quantities out of the Blood: By these means the Quantity of Blood being lesser, it gives fewer Spirits, when it is broke down; and is not so capable to be so comminuted, because of the Parts of Blood not pressing so much one upon the other in the whole Course and Time of Circulation: Or, Thirdly, by some means that affect the Parts that transmit these Spirits; so that now no Spirits can be separated, or in a smaller Quantity.

If we apply the Wounding by *Cantharides*, or its Effects, to all these ways, we shall find, that in the first Consideration, the *Lympha* separated in a *Blister* is nothing at all concern'd, and that the stupendous Effect might possibly be produced without any such Discharge. But if you go farther, and suppose the *Cantharides* got into the Mass of the Blood, without any gathering of Waters, you cannot suppose that the Parts of *Cantharides* that are so subtle, so Alkaline, and which, by other Experiments, make the Blood so Fluid, can be any great Enemies to the Rarefaction of the Blood, which makes Spirits, and fits them to be separated; or any considerable Instrument in lessening the Rarefaction, which is requisite and absolutely necessary, by the first Condition. Neither are they, in their Nature, fit Instruments for the 3d; besides that we find no Signs and no Marks of such an Interruption, either in the Brain or any where else. The 2d Condition for hindering so great a Preparation, and so great a Separation of Spirits, is the Effect of all Evacuations. So that, by the by, Evacuation is the great Indication for the Cure of a Fever, and is a great deal more evident than any supposed Poison, or Malignity supposed to be discharged, by supposed Alexipharmacks, that are supposed Antidotes: Yet this Effect by an Evacuation is granted, and by the way of working will be found unable to discuss all the Phenomena, in doing it in so short a time as in the State of our Proposition.

Let us therefore enquire if a *Blister* that makes small Wounds, and cures a Fever in a short time, can produce this its Effect in the only way we have left us; and that is by wounding that Channel that carries those Spirits that contract the Heart, give us a quick Pulse, and a Fever, with all its Attendants, Deliriums, &c. If this Supposition is allowed of, no doubt but that any the least Quantity of Animal Spirits let out by such Wounds, in a very little time, will proportionably weaken the Heart's Contraction, and give us a slower Pulse; which is all we want: And which is more, this slower Contraction, which is known by our slower Pulse, determining the whole Circulating Blood with less Force, the Parts of Blood do not comminute themselves so much as when the Motion was more rapid; and, by consequence, there is not such a Disposition for separating small Parts in the Brain, that afterwards they may be derived through the Nerves into the Heart. But moreover, the lesser Motion continuing for some little time, or 2 or 3 Minutes, in a Velocity something like our natural Motion; all the Secretions, which are perform'd in such Degrees of Velocity, will again begin to be done as before.

If

If therefore we can put little *Emissaries* on the *Nerve*, that is more especially concern'd in the *Heart's Contraction*, we shall hinder any *Preparation* in the *Blood* for *separating* so great a Number of *Spirits*; which is one great Requisite: Nay, we shall make *Secretions* of that sort, and in that way as in time of *Health*; and if there be but *Secretions*, the *Contriving Parts*, and those to be broke down, shall have no such a close *Contact*, and therefore that extraordinary Quantity of *Spirits* shall not be prepared in the *Blood*; and if they are not prepared, they cannot be separated from it; or a Moderate Quantity of *Animal Spirits* shall be conveyed into the *Muscular Fibres* of the *Heart*: Or again, which is the same thing, its *Contraction* shall be *Natural*; and all this may be done, or begin to be done, in 2 or 3 *Minutes*.

But how we shall apply a *Blister*, that may wound the *Conveying Nerve*, is the only Question that remains. To do this, we must remember, that the 8th Pair of *Nerves*, which serves for the *Heart's Contraction*, has its Rise from the Sides of the *Medulla Oblongata* behind the *Processus Annularis*, by several Threads which join together, and go out by the same Hole that the *Sinus Laterales* discharge themselves into the *Jugulars*: And since the Union by the *Atlas* is not so firm and compact as in the other *Vertebra*, it is evident, that there is no extraordinary Hindrance, why some of these *Wounding Parts* may not come at that *Nerve*. But if you reflect again, that this *Nerve*, or considerable *Branches* of it, run superficially enough on the *Neck*, you will have less Difficulty to apprehend how some of them are wounded, and to understand how these miraculous *Effects* do happen, and are produced. Or it is easy to understand how the small Parts of *Cantharides* can wound the 8th Pair, or by wounding its *Branches*, derive from the *Nerve* itself, and lessen the Motion of its *Liquor*. Or, 'tis not hard to apprehend how wounding by *Cantharides* hinders the Disposition of separating *Spirits*, and intercepts them in their way to the *Heart*; how they make its weaker *Contraction*, and a slower *Pulse*. Or again, it is evident, how the small *Emissaries* made in this way can cure a *Fever*, and a *Delirium*, in a shorter time than is supposed in the *Proposition*.

From this Discourse we may deduce these *Corollaries*: 1. That the Operation of a *Blister* is great and sudden: That the *Wounding* of this *Nerve* or a *Branch*, is so absolutely necessary for curing a *Delirium* and a *Fever*, that whatsoever *Mischief* the Applying of vast Numbers of *Blisters* over all the Body may do, yet the main End is neglected, if you forget a large one high on the *Nape* of the *Neck*. That if there is no *Vesication* after the laying on a strong *Plaster*, it necessarily establishes a new and prodigious *Hardness* in the *Skin* and *Vessels*, and a *Thickening* of the *Blood* for a farther total Stop.

XXXI. About the beginning of November, 1693, after a constant Course of moderately warm Weather for the Season, upon some Snow falling in the Mountains and Country about the Town, of a sudden it grew extremely cold, and soon after succeeded some few Days of very hard Frost; whereupon Rheums of all kinds, such as violent Coughs, that chiefly affected in the Night,

Observations on
Epidemical Di-
stempers, by Dr.
Tho. Molineux.
n. 209. p. 109.

Night, great *Defluxion* of thin *Rheum* at the Nose and Eyes, immoderate Discharge of the *Saliva* by Spitting, *Hoarseness* in the Voice, sore Throats, with some Trouble in Swallowing, Wheasings, Stuffings, and Soreness in the Breast, a dull Heaviness and Stoppage in the Head, with such like Disorders, the usual Effects of *Cold*, seized great Numbers of all Sorts of People in *Dublin*.

Some were more violently affected, so as to be confined a-while to their Beds; those complain'd of *Feverish* Symptoms, as Shiverings and Chilness all over them, that made several Returns; Pains in many Parts of their Body; severe Head-aches, chiefly about their Foreheads, so as that any Noise was very troublesome; great Weakness in their Eyes, that the least Light was offensive; a perfect Decay of all Appetite; foul turbid Urine, with a Brick-colour'd Sediment at the Bottom; great Uneasiness and Tossing in their Beds all Night: Yet these Disorders, though they much frightened both the Sick and their Friends, usually without Help of Remedy, would abate of themselves, and terminate in universal *Sweats*, that constantly relieved. This more violent Degree of the *Cold* was more apt, I found, to fall on such as were given to Excess either in Eating or Drinking, or inclinable to a *Scrophulous* Disposition of Body, than on those that were more temperate, and less subject to Obstructions.

When the *Cold* was but moderate, it usually was over in 8 or 10 Days; but with those in whom it rose to a greater Height, it continu'd a Fortnight, 3 Weeks, and sometimes above a Month; one way or other it universally affected all kinds of Men; those in the Country, as well as City; those that were much abroad in the open Air, and those that stay'd much within Doors, or even kept close in their Chambers; those that were robust and hardy, as well as those who were weakly and tender; Men, Women, and Children, of all Ranks and Conditions, the youngest and the oldest; though I think if it were favourable to any Sort, it most spared those that were Aged, among whom I knew several that were not the least troubled with it, yet it seiz'd so universally, that not one in 30, perhaps I might safely say more, escaped it.

As it first appear'd towards the Beginning of *November*, so it seem'd to arrive to its greatest Degree of *Vigilance*, and spread most *Universally*, about the Middle of it; and by the Beginning of the Month following, it very sensibly abated; so that very few then complain'd of their *Colds*. So that in the Space of 4 or 5 Weeks, it had its *Rise*, *Growth*, and *Decay*; and though from first to last it seized such incredible Numbers of all Sorts of Men, I cannot learn that any one truly died of it, unless such whose Strength was before spent by some tedious Fitt of Sickness, or laboured under some heavier Disease complicated with it.

I find that about *November* and *December*, 1691, by some short Notes I took then, *Coughs* were more than ordinary frequent here in *Dublin*, though nothing comparable to what they were lately; they chiefly then affected young Children, whose *Coughs* usually turn'd to a violent *Chin-Cough*; yet at this time, among all the Variety of *Coughing* Children, I have not met with

with more than one, that was troubled with a *Chin-Cough*, and that too was but in a slight manner; which minute Differences, in the ways of *Epidemick* Distempers operating in our Bodies, clearly shew, that their *Causes* cannot be ascribed only to the sensible *Alterations* of the *Weather*, or the manifest Qualities of *Heat*, *Cold*, *Moisture*, or *Dryness*, highly predominant in the Air, according to the vulgar Solution of them; but that they proceed from something more nice and latent than all this.

But to return to our general *Cold*; it was farther remarkable for its *vast Extent*: It seiz'd them at *London*, *Oxford*, and all other Places of *England*, as *universally*, and with the same *Symptoms*, as it seized us in *Dublin*; but with this observable Difference, that it appeared 3 or 4 *Weeks* sooner in *London*, than in *Dublin*. It also reach'd the *Continent*, and infested the Northern Parts of *France*, as about *Paris*, *Flanders*, *Holland*, and the rest of the *United Provinces*, with more *Violence*, and no less Frequency, than it did in these Countries; so that I believe no *Epidemick* Distemper was ever observed to extend so far.

No Example of any *Epidemick* Distemper seems in all respects to come nearer in Competition with our late general *Cold*, than the *Transient Fever* in 1688. This short sort of *Fever* was first observed in *Dublin* about the beginning of *July*, and it so *universally* seiz'd all sorts of Men whatever, that I then made an Estimate not above one in 15 escaped. It began, as generally *Fevers* do, with a *Chilness* and *Shivering* all over, like that of an *Ague*, but not so violent, which soon broke out into a dry *Burning Heat*, with great *Uneasiness*, that commonly confin'd them to their Beds, where they passed the ensuing Night very *restless*: They complained likewise of *Giddiness*, and a *dull Pain* in their *Heads*, chiefly about their *Eyes*, with unsettled *Pains* in their *Limbs*, and about the Small of their *Back*, a *Soreness* all over their *Flesh*, a *Loss* of *Appetite*, with a *Nausea* or *Aptness* to vomit, an unusual *ill Taste* in their *Mouths*, yet little or no *Thirst*: And tho' these *Symptoms* were very violent for a time, yet they did not continue long; for about the 2d Day of the Distemper, the Patient usually of himself fell into a *Sweat*, (unless 'twas prevented by letting *Blood*, which however beneficial in other *Fevers*, I found, manifestly retarded the Progress of this) and if the *Sweat* was encouraged for 5 or 6 *Hours*, by laying on more *Cloaths*, or taking some *Sudorifick* Medicine, most of the Disorders before mentioned would entirely disappear, or at least very much abate. The *Giddiness* of their *Head*, and Want of *Appetite*, would often continue some days afterwards; but with the use of open fresh Air, they certainly in 4 or 5 *Days* at farthest recovered these likewise, and were perfectly well. This *Transient Disease* was so favourable, that not one in a *Thousand* died of it: And by the middle of *August* it wholly disappeared; so that it had run its full Course through all sorts of People in 7 *Weeks* time. It also spread itself all over *England*, and raged as generally in *London* as in *Dublin*, and with the same Concurrence of *Symptoms*. But it began to be taken notice of at *London* about the middle of *May*, and it continued there till the latter end of *June*; so that it did not shew itself here till it had wholly disappeared there. And it was very remarkable,

markable that in *England*, as well as *here*, a short time before this *General Fever*, a slight Disease, but very *universal*, seiz'd the *Horses* too, and shew'd itself by a great *Defluxion* of *Rheum* from their *Noses*; which shews the *Cause* of *Spreading Distempers* to be so prevalent, that it works not only on the finer and more delicate Composition of *Humane Bodies*, but affects even the more strong and gross Frame of one of the most *Robust* Animal Productions in Nature.

From these *Histories* one may probably gather, that spreading *Epidemick Distempers* take their Progress from *East to West*. But this should be farther confirm'd by more frequent Observations, before one may safely determine any thing in this Matter. However, this is certain, that the *Plague* and *Pestilential Fevers* rage more frequently in the *East*, towards *Constantinople* and the *Levant*, than in these more *Western* Parts of *Europe*; as if that seem'd a more natural *Clime* for their *Rise* and *Propagation*.

Exotick Diseases propagated by Trade and Infection; by Dr. Lister. n. 165. p. 793. Plague. Small-Pox.

XXXII. 1. The *Plague* is properly a *Disease* of *Asia*, where it is *Epidemical*; and is never bred amongst us, but comes to us by *Trade* and *Infection*.

2. The *Small-Pox* also is an *Exotick Disease* of the *Oriental People*, and not known to *Europe*, or even *Asia Minor*, or *Africa* at all, till a *Spice-Trade* was open'd by the latter Princes of *Egypt* to the remotest Parts of the *East-Indies*, whence it *Originally* came, and where its rages more cruelly at this Day than with us.

The like I think of the *Gripping of the Guts*, that it is a peculiar *Disease* of the *West-Indies*, and yearly receiv'd from thence, for this Reason, that it is none of the *Tormina Ventris* of the Ancients; and therefore call'd by a new Name, by such as have writ of it; and also for that it is yet scarce known in any Part of the *North of England*, or *Midland Countries* thereof.

An Experiment concerning the Plague; by Dr. Jo. Bapt. Alprunus, Ph. Col. n. 2. p. 17.

XXXIII. No *Poison* is greater than that of the *Sickness*; our outward Senses are not affected by it, and our Understanding does not comprehend it; 'tis *Aërial* and *Volatile*, and 'tis fixed and coagulated when it concretes into *Buboes*. Hence I conceiv'd that the Way for me to penetrate into the most latent Quality of this *Pestiferous Venom*, was by *Chymistry*; not with Knives, but *Glasses*; not with Iron, but *Fire*. This horrid Undertaking (for the Glory of God, for the Favour of my Prince, and the Good of my Neighbour) I set upon without Dread. Having lanced a *Pestilential Boil* of M. Godfrey Reshel, I collected the *Virulent Matter*, and putting it in a *Retort*, and luring a *Receiver* to it very close, I apply'd Degrees of *Fire*; at first came over a *Water*, then a more Fat and *Oily Matter*; and at last a *Salt* ascended into the Neck of the *Retort*. The *Fire* being remov'd, and the *Glasses* separated, there came forth so great a *Stench*, that a thousand Wounds exposed to the Summer-Heat could not have parallel'd it. And though I thought I had sufficiently arm'd my Senses against it, that is, my Ears with Cotton, my Nose with Pessaries, my Mouth with Sponges, all dipped in Vinegars and Treacles; yet, as if touch'd with a Thunderbolt, I was struck with a violent Trembling of my

my Body. To make short, having broken the *Glass*, I gave some of this horrible stinking Salt to M. Resbel to taste, and then I tasted it myself, and 'twas found to have an *Acrimony* as great as *Aqua Regis*.

Hence no wonder, that so many are so afflicted with continual *Vomiting*, so that they can keep neither Meat nor Drink, since their Stomach is continually irritated to this Expulsion by a *Poisonous Quality* so sharp.

Hence no wonder, if from the *Sharpness* of this *Venom* agitating the Humours, and urging the expulsive Faculty to a continual Perturbation of the Belly, a *Diarrhœa* is often caused, which follows the Patient to Death.

Hence no wonder, that from this sharp Matter, such piercing Pains are felt in *Buboes*, and such *Burnings* in *Carbuncles*.

Hence no wonder, why the best Remedies (and as it were the Anchors of Safety) are *Sudorificks*, allaying the *Acrimony*, and driving it out through the Pores; for I found those always which sweat, were in a hopeful Way of Recovery; but those which did not, were almost all taken off. I therefore ordered *Sudorificks* to be repeated every eight Hours, and strengthening *Cordials* every Hour.

My usual *Sudorificks* for the better Sort were, *Species Diamosci*, *Diambra*, *Liberantes Pannonica Rubra*, *Extractum contrayervæ*, *Lapis Bezoar*, *Unicornu Marinum*, (my *Specifick Powder*) *Sal. C. C. volat.* *Succinum volat. concha* *Perlar. Volatil. Aqu. Cord. temp. cum Moscho. Scorzon. Cardui Bened. Syr. Scordii, Corallor.*

For the meaner Sort, *Species Cord. temperat. Electuar. de Ovo, Antimon. Diaphoret. Bezoarticum minerale Joviale cum Aquis supradiet. & Syrup.*

My *Cordials* for the richer Sort were, *Confect. Alchem. de Hyacinth. magist. Perla. Hyacinth. Granator. cum Aquis è toto Citro, Saxon. Sala, &c.*

For the meaner Sort, *Corallia rubra contusa, Confect. Alchem. incomplet. cum Aquis tormentil. Cardui bened. &c.*

These were in general the Medicines used in this Distemper, but with Variety, according as the Age, Temperature, and Condition of the Patient required.

But because no *Alexipharmack* is sufficient in this Contagion, therefore grounding my Judgment upon the Principles of *Harvey* about the Motion of the Heart, and the Circulation of the Blood, and some other of *Bartholine* and others, I concluded this *Pestiferous Venom*, attracted by the Breath or Pores, by the Circulation of the Blood, to be carried to the *Axillary* and *Inguinal Glands*, &c. where if it long stagnates, it concretes into *Buboes*, which tend to *Maturation*; but if it opens itself a Way, and passes with the natural Motion of the Blood, and so is carried to the Heart, then Death ensues. Therefore not only for myself, but for two other Friends, I made *Incision* with a *Lancet in Inguine dextro & sinistro*, and put in a *Seton*, to the end that by this artificial Way the *Venom* might find a Passage. This I often tried with good Success, great quantity of Matter always voiding that way, but more notably when I was any way touch'd with *Pestilential Streaks*, or Alterations: By the help of which, I kept myself in good Health during the Contagion, which raged here at *Prague* in 1680.

A Preservative
against this Con-
tagion.

*An Universal
Preservative a-
gainst Infection;
by Dr. Jaco. Joh.
Wenceslaus Do-
brzensky de Ni-
gro Ponte. Ph.
Col. n. 2. p. 20.*

XXXIV. Whosoever converses with Patients affected with any *Disease* whatever, if he would preserve himself from *Infection*, must be sure, so long as he abides within the Sphere of the Steams, never to swallow his *Spittle*, but to spit it out. For this Author conceives that to be the Part which first and most easily imbibes the *Infection*, and by that swallowed the *Infection* is carried, as by a proper Vehicle, into the *Stomach*, where it works those dismal and fatal Effects.

This Sentence of his he grounds, both upon his own Experience, long tried for his own *Preservation*, and on divers Reasons set down by way of Aphorisms from this *Hypothesis*, viz.

That most *Diseases*, especially *Pestilential Fevers*, are *infectious*; that this proceeds from a *Seminal Ferment*, which is emitted by the Patient by way of *Steams* into the encompassing Air, and so *infects* all things within a certain Sphere or Distance: This drawn into the *Mouth* by the *Breath*, is apt to *infect* the *Saliva* or *Spittle*; which being *swallowed*, *infects* the *Stomach*, and so the rest of the Body; but being *spit* out, frees the Body from *Infection*. And therefore he conceives that strong *Smelling* and strong *Tasting* Substances, kept in the Mouth and chewed to promote *Spitting*, are of very good and necessary Use for *Physicians*, *Chirurgeons*, and *Apothecaries*, &c. that are necessitated to visit *infected* Persons.

*An Hydropho-
by; by Dr. Mart.
Lifter. n. 147.
p. 162.*

XXXV. James Corton, (of York) a very strong and well built young Man, was *bit* with a *mad Dog* in the Right Hand, the Wound heal'd of itself, and the thing was forgot. After about 5 or 6 Weeks, he complains of *Pain* all over his *Bones*, but especially his *Back* and round about his *Stomach*, looks very *Pale*, *Hollow-ey'd*, &c. The 3d Day after this Complaint, viz. Sunday Mar. 11. 1683. he call'd for burnt Brandy, drank it, went to Bed, and vomited it up; after this he had a *restless Night*, and in the Morning found himself very ill, with a strong *Rising* in his *Stomach*, and tho' no *Thirst*, yet an Impotence to *drink*, and even to swallow his *Spittle*, which was Death to him, as he often said. *Diascordium* and a Bottle of *Cordial Water* was brought to him by an Apothecary that Morning; the *Diascordium* he took, but was not able to *drink* of the *Cordial* one Spoonful: This on Monday Morning. About one o' Clock that Day I first saw him, and found him upon his Bed, his *Pulse* very *slow*, and sometimes *unequal*, but not unless frightened from the *Rising* of his *Stomach*; his *Flesh* cold, his *Tongue* not dry, but flexible and *moist*, a little *white*. I caused him to rise off the Bed, and set him full in the Light; and then, because he mightily complain'd of I know not what Sicknefs about his *Stomach*, I offer'd him of the *Cordial*; but he *started* and *trembled* at the Approach of it. This I exceedingly admired; wherefore I call'd for a Glafs of *Wine* or *Water*, and a Tumbler of *Water* was brought me up, which I gave him to *drink*; but he vehemently *started* at it, and his *Stomach* swell'd and *rose* after I know not what odd and strange manner; and I could then find his *Pulse* very *trembling* and disturb'd. I still urged him to *drink*; but as I put it forwards to his Mouth, he, the more *affrighted*, drew back his Head, and *figh-*
ed,

ed, and ey'd it with a most ghastly Look, not without *Skreeking* and Noise : This soon convinced me that it was *Aqua Pavor*. I forthwith order'd a *Vein* to be opened in the Arm which was *bit*, caused the *Wound* to be *scarify'd* and drawn with *Vesicatories*, and the same Plaister to be applied to the Neck and Legs, and the Inside of the Arms : I ordered the usual and fam'd *Antidotes* to be given him, as of *Theriaca*, *Cinis Cancrorum*, *Ruta*, *Agaricus*, &c. in *Bolus's*. For it is to be noted, that solid things in a Spoon he could take, but not yet without much *Trembling* and *Fear*, and *Caution*, and an earnest Request that no Body would suddenly offer them to him, but give them into his Hand gently ; and then he would, by degrees, steal his Hand softly towards his Mouth, and of a sudden chop the Spoon in and swallow what was in it, *velut Canis ad Offam* ; and this he did more *greedily* and readily than any other Man could do. Of these *Antidotes* in *Bolus* he took a *Dram* every *Hour*, and always in this Manner, for at least a Dozen times taking ; and likewise *Drink* was proffered him in the Night ; but he could not see it without *Horror*, and the same Motions from his *Stomach*. Nay, he did affirm, that as oft as he by chance swallowed any *Spittle*, it went to his Heart, even as though he should die that very Moment. This Night passed wholly without any *Sleep* or *Rest*.

Tuesday Morning I viewed his Blood, which was, both as to the *Serum* and *Cake*, well coloured, and in such Proportion as is usual in healthful Persons, and of good *Consistence*. He had now a *violent Fever* upon him, and a very *quick Pulse*. *Water* was offered him by my Order, but in vain, he begging he might die unmolested ; nothing being such a *Terror* to him as the Approach of any *Drink*. I then, with much Difficulty, persuaded him to cast himself cross the Bed upon his Belly (for he had his Cloaths loosely about him) hanging his *Head* over the other side ; persuading myself that this Posture might be advantageous to his *Drinking*, since that in the erect Posture of a Man he could not so much as endure the Approach of Liquor. In this Posture then of a *Dog*, he suffer'd a large Bowl filled with *Small-Beer* to be brought under his Head, and embracing it with Raptures of Joy, he declared he was infinitely refresh'd with the Smell of it ; that he now saw it with Delight, and assured us he should be able soon to *drink* it all off. And he that now thought himself a dying Man, talked pleasantly, and said many passionate things to his Brother, Wife, &c. wonderfully extolling this Invention, and thanking me for it. He endeavoured with great Earnestness to put down his Head to it, but could not : His *Stomach rose* as often as he opened his Lips : At length he put out his Tongue, and made towards it as though he would *lap* ; but ever as his *Tongue* never so little touched the Surface of the *Beer*, he started back *affrighted* : And yet all this while was pleased with the Thoughts of *Drinking*, and would not suffer the Maid-Servant to take it away from under his Head ; and if she did a little withdraw it, he said he followed it, by the Smell, with Delight, snuffing with his Nostrils. After a long time, being mightily foiled, he alledged, that the faint Smell of the *Small-Beer* hindered him from *Drinking*, and therefore desired a Bowl of *Ale* ; which was brought him ; but
after

after much striving, and exerting his *Tongue* a thousand times, he could not *drink* of it; and *lapping* with great *Affrights*, as oft as his *Tongue* touch'd it, he started back with his *Head*, bringing it down again gently to the *Bowl* a hundred times, but all in vain. And in this *Posture*, what upon his *Belly*, and what upon his *Hands* and *Knees*, he kept himself at least an *Hour* thus tantalizing himself; but it was not in his *Power* to *drink*. We then gave him a *Quill*, which consisted of two or three *Joints*, the one *End* in his *Mouth*, the other in the *Liquor*; but he could not manage it, nor *suck*, no more than a *Dog*. I persuaded him to give over and lie down, which he did; and not long after my going away, he fell into a *Convulsion Fit*, *bit* and *snarl'd*, and *catch'd* at every body, and *foam'd* at the *Mouth*. After this *Fitt* was over, he took an *Elleborism* in a *Bolus*, which was taken like the rest, and very willingly by him; it wrought about three or four times very plentifully, and he declared himself wonderfully at ease by it; but yet now and then fell *convulsed*, and then always insensible. And after four *Hours* I returned to him again, and found the *Minister* with him; he talked very sensibly to him, and prayed very earnestly with him, saying the *Prayers* after him, and desired the *Sacrament*, which in these *Circumstances* could not be given.

He was again solicited to *drink*, and he now readily enough put himself into the former *Posture*, and with as much *Earnestness* as ever used all the little *Shifts* to *drink*, while the *Bowl* was under his *Head*; but all in vain. He had a little *Silver Tumbler* filled with *Drink* put into his *Hand*; which suddenly, when he had as it were stolen it near his *Mouth*, he would have thrown it into his *Throat*, as he did the *Bolus's*; but it hit against his *Teeth*, and fell into the *Bowl*. I cannot say he ever went to *Stool*, or made *Water* all this time, and therefore had a *Clyster* given him; but upon parting with it, which he did immediately almost as soon as given, he died *convulsed*: But his not *making Water*, as well as a troublesome *Priapism* which he complained of when upon his *Knees*, might proceed from the *Blistering Plaisters*, as well as from his *Disease*.

That nothing may be omitted which relates to this *Case*; the *Day* after his *Interment*, I accidentally met with his *Cousin Mrs. S.* who told me that her *Daughter* was in *Fear*; for just that very *Day Fortnight* before his *Death* she had been at his *House*, and he would go home with her to her *Mother's*; that she remembred his *Hand trembled*, and his *Body shaked*; that he was in a *cold Sweat*, and in a great *Disorder*, so that she asked him what he ailed? he told her, that after his *Work*, (for he was an *Upholsterer*) it had been of late usual with him. And, which was remarkable, the very *Dog* which *bit* him, came at that time along with him to her *Mother's House*, and was alive and well at the *Man's Death*.

To this we may add, that *Mr. Widdow*, a *Mercer*, doth affirm, that about the very time that *Mr. Corton* was thought to be *bit* with *Mr. Sutton's Dog*, a black *Dog*, which he verily believes to be the same, came and *bit* a *Whelp* of his in his *Shop*. The next *Day* the *Whelp* ran *mad* up and down the *House*, and *bit* both him and the *Maid* in the *Leg*, and died that very *Day*. About a *Month* after he was *bit*, he found himself not well, and

was

was troubled with a Pain at his Heart, and had a Fearfulness and Trembling upon him, and got no rest for three Nights; upon which he had himself blooded, and found himself better. His Maid doth not yet complain of any Harm.

It is very hard to give any probable Reason of this *Aquæ Pavor*: What Galen (*de Theriaca*) says of their much coveting Water, because of the intolerable Thirst upon them, agrees not with our Case. For this Man would often say, that he was not thirsty, which also appeared by the Moisture and Flexibility of his Tongue. Nor was he distracted, as Galen would have them, but all the time in his Wits, and discoursed rationally. What Julius Palmarius means by the third Paroxysm of an *Hydrophobia*, I cannot understand; for this Man had the Disease upon him continually, from the first Moment to his Death, which was near 48 Hours, without any Intermision. Dioscorides treats of it most soberly, and is to be credited; *Quidam, qui jam Aquæ metum sentirent, sumpto Helleboro, simulac primum Morbi impetum experirentur, sauci sunt: Nam & jam vitio tentatos nemo unquam servare potest.* This very well agrees with our Case: The latter Person, who had a Sense of the Evil, had it prevented by bleeding; but our Man, who had the Evil, that is, the *Aquæ Pavor* upon him, not Bleeding, or the most famed Antidotes, or even Hellebore, could in the least save, tho' not very untimely given him.

De Morbis
Contagiosis.

The Case indeed so rarely occurs, that it cannot be observed in all due Circumstances, in order to its clearer Understanding, and consequently Cure; we shall venture however, to lay down some few things to solve it by.

First, That J. Cotton had some of the Organick Parts of his Body transformed into, or affected after the Nature of a Dog, especially the Gula, Tongue, &c. so that what was offered to him in the erect Posture of a Man was very frightful, as well as difficult for him to take, because against his new Nature, as much as it would be for us to get a Dog to drink standing upon his hinder Legs. But yet this is not all; for when he was turned upon his Belly, and would have acted the Dog, he could not drink; and though he frequently put out his Tongue and lapp'd, yet he could not endure to take any thing into his Mouth of Liquor, as though something had hindred him within. Therefore we may imagine he was also convulsed in those Parts, or swell'd; but this we cannot grant, for the Contrary does plainly appear, because he could cast any thing into his Mouth and swallow it; as he did very many times stiff Bolus's, more nimbly as to the Swallow, than any Man reasonably could be supposed to do that was so weakened.

Secondly, That his Spittle was envenomed; for as oft as he swallowed it, (his Stomach vehemently abhorring it) it went to his Heart, (as we say) and was even present Death to him. And so liquid things coming nearer to the Consistence of Spittle, might the rather move *Salvum*, and therefore give him a greater Terror and Difficulty to swallow, than solid things. And that his Spittle chiefly was infected with the Venom of the Dog, seems probable

Gal. de Locis
Affect. Lib. 6.

probable from these Reasons also: 1. Because the *Dog* bit him, whose *Spittle* alone to be *Venomous* to the Touch, there are many credible Instances in *Medical History*. 2. He was almost like a *Dog* in the Mouth, viz. where are the proper Organs of the *Saliva*. 3. The *Bite* of a *Man* so bitten is alike *Infectious*, but otherwise *Innocent*.

But it may be ask'd, how comes it to infect his *Spittle*, and not other *Humours*, and the *Blood*? I answer, the *Blood* in part was undoubtedly affected, as the *Symptoms* arising before the *Aqua-Pavor* (which yet is the only true *Pathognomick* of the *Disease*) demonstrate. Again, the *Blood* is not one *Liquor*, (as is generally thought) but many distinct *Liquors* circulated together in one Set of common Vessels; and so it might infect that *Liquor*, which it was most a-kin to, as the *Saliva* of a *Dog* to the *Saliva* of a *Man*.

An Hydro-
phoby; by Dr.
Roger Howman.
n. 169. p. 916.

XXXVI. On *Wednesday* at Evening, Oct. 1. 1684. I was called to a Patient at *Norwich*, who about six *Weeks* before had been bitten with a mad *Fox* on the *Right Hand*; he began to be indisposed the *Saturday* before with running Pains; yet so well, as to be abroad next *Day* at Church. On *Monday*, his Pains grew more troublesome, and the *Day* following much worse, especially on his *Right-hand*, *Arm*, *Shoulder* and *Back*, but not to *Confinement*. On *Wednesday*, (I know not by whose Advice) he took a Dose of the common *Purging Spirit* of *Scurvy-grass*, which gave him seven or eight *Stools*, and made him very faint and weak; so I found him; and complaining that he could not use his *Right-Hand*, (it beginning to be *Paralytical*) tho' his Pains very much abated there, and where else they had been most troublesome, excepting only on the lower Parts, or Small of his *Back*, where they soon after vanished also. He told me he bled freely at the Wounds the *Fox* had made, and that they healed without any farther Trouble, than now and then a little grinding Pain on that *Hand* and *Arm*; and farther said, (to please his Friends) he had taken a *White Powder* of an *Apothecary*, and believed himself in no *Danger* of what was feared, (for I had discovered the *Danger* I apprehended in his Condition.) Though the *Aqua-Pavor* did not yet appear, his *Heat* was much increased, and his *Pulse* intermitted every fifth or sixth *Stroak*, but on the *Right Side only*; which I again and again examined, finding no Variation: He also looked ghastly and thin, but his *Eyes* sparkling and fiery. I prescribed the best temperate *Antispasmodic* and *Antiparalytic* Remedies I knew, to be mix'd with the *Specificks* of common use in an *Hydrophobia*; thus much on *Wednesday* at Night. Next *Morning*, he complained his Night had been restless; that then he had wholly lost the Use of his *Right Hand*; and though the Pains were more abated, yet he was very hot and uneasy: His *Pulse* then was much stronger than over Night, but intermitted on the *Right Side only* as before; his Countenance was somewhat more ghastly, yet his *Veins* very full as in *Initio & Augmento Febris*; and no *Hydrophobia* appearing, I advised him to bleed six or seven Ounces at the *Left Arm*, (the *Right* being *Paralytical*) and the Continuance of what I had prescribed before; he bled 8 Ounces very freely, the *Blood* well coloured, but very thick. After I left him, the great *Symptom* appeared; and in my Absence, another was consulted, who gave him

him many Remedies. At my Return out of the Country on *Friday*, at Six at Night, his *Heat* was very great, and his *Pulse* very high, and *intermitted* then on both *Wrists*; and if any thing were offered him to *drink*, *standing* or *sitting*, he *started* as if his *Head* would have fallen backwards off his *Shoulders*; but then *laid* upon his *Pillow*, could (though with great *Difficulty* and *Uneasiness*) now and then get down a *Spoonful*. He looked then very thin and ghastly, and seemed shy or afraid of every body that came suddenly near him, telling them that they stifled him, or stopp'd or hindred his *Breath* in coming so hastily to him. His *Reason* was all along very good, and (as some observed) better than in his *Health*: His *Voice* was broken and imperfect, as theirs whose *Tongue* and other *Organs* of *Speech* are growing *Paralytical*. I saw him again at Ten that Night, when all *Symptoms* were growing worse; yet he could then walk out of one *Chamber* into another, with very little *Help*; but between Twelve and One next Morning he *died*, without any *Convulsive* Motions, *Sighs* or *Groans*; as if in a Moment there had been a total *Paralysis*.

From this Relation it's most observable, 1. That as the *Pains* (which were like those in the *Rheumatism*) abated, the *Paralysis* and *Fever* increased. 2. As the *Fever* increased, the *Intermission* of the *Pulse* grew more frequent, though the *Pulse* were much stronger; but why it *intermitted* first on but one *Side*, is not easily accounted for. 3. That the Imperfection of *Voice*, as well as the *Difficulty* of *Swallowing*, were the Effects of the *Paralysis*, may probably be allowed, and be a satisfactory Reason why the Person Dr. *Lister* mentions, could not use the *Quill* which was given him to *suck* with. 4. That his thin ghastly *Aspect*, the Defect of *Spirits*, and Tonic Vigour, (if I may so call it) was from a *Paralytical* Original, is not unreasonable to conjecture. 5. That the *Paralysis* chiefly affected the *Muscles* of the *Head* and Upper Parts, may be partly collected from his Inability to hold his *Head steady* at the Approach of any *Liquor*; the *Fear* thence arising, causing him to *start*, and his *Head* so to fall backwards, as if it would fall off his *Shoulders*. 6. And that his Lower Parts were less affected, is probable, because, two or three *Hours* before he *died*, he could walk out of one *Chamber* into another, even when his *Voice* was hardly intelligible.

XXXVII. In the Year 1688, there was brought to us for Cure a Child of about three Years of Age, who had just then received a large *Wound* upon the *Masseter Muscle* by the *Bite* of a mad Dog. The *Wound* we treated with *Digestives* for some time; *Sutures* were forborne, though otherwise necessary; that the *Sanation* thereof being deferr'd, the contracted *Venom* might have the freer *Egress* thereat. There was in short time discharged a very laudable *Pus*, and the *Wound* *incarned* as fast as we could desire. In about three Weeks time, we had *incarned* and brought over a very firm and seemly *Cicatrix*; and in about two Days after *cicatrizing* the *Wound*, the Child was seized with a *Fever*, a disorderly *Pulse*, and *Palpitation* of the *Heart*: The Night ensuing, he grew *Delirious*; and the succeeding Day, the *Malignity* had made so virulent an *Impression* upon the *Animal Spirits*, as

A Child bit
by a mad Dog;
by Mr. I. Tur-
ner. n. 207.
p. 24.

did excite very strong Irritations in the Members of the Body, by *convelling* of their Muscular Fibres. Neither was the *Brain* and its Parts freed from the same Morbid Taint, which manifested its Ferocity in a most strange and unusual *Distortion* of the *Eyes*, from a confused and irregular Expansion of the *Optick Nerve*, attended with an extraordinary *Fierceness* in the whole Visage, continual *Vigilies*, and a constant *Trepidation*, with a reiterated *Snatching* up of the lower *Mandible*, making Signs as if he would have *bit* at any thing that was offered him. His *Voice* was uttered with a *Canine Hoarseness*, and had an extraordinary Resemblance to the *Barking* of a *Dog*: He was moreover infested from that time with a *Singultus*, and *Foaming* at the *Mouth*. He was no sooner sensible of the *Reflection* of a *Looking-glass*, which out of Curiosity I presented before him, than he *threw* his *Head* backwards with great Violence, and continued *Barking* and *Snapping* at every thing near him. In the Evening, notwithstanding such *Alexipharmacks* as had been exhibited, he sunk under the Oppression of these cruel *Symptoms*. I was not permitted to open him: But the *Abdomen*, I perceived, was excessively *inflated*, his Limbs *convulsed*, and the Superfice of the Body of a *livid* Colour; the Muscles of the Face were drawn into such a Form as did nearly represent a *Spasmus Cynicus*.

Two Boys in
Ireland bit by a
mad Dog; by
Mr. Kennedy,
n. 242. p. 246.
n. 243. p. 308.

XXXVIII. About the last of *Oct.* 1679, it happened that two Boys of 10 and 9 Years old, of a Sanguine and Cholerick Complexion, did *touch* and *handle* the Head of a *Dog* which had been wounded by a *mad Dog*, but by the *handling* and *washing* of his *Wound* by the Children, the *Dog* so wounded was healed, and did not become *mad*. But about *May* 1680, the Children became *unwell*, and were seized with a *paining Grief* towards the *Bottom* of their *Bellies*, which did grind and torment them with *Pain* and *Trouble*, which ascended gradually upwards towards their *Navel*. And about the 1st of *July*, together with the foresaid *Grief*, they were taken with a slow *Flux*, and with *Fainting Fitts* by times, when the foresaid Pains assaulted them. After they had continued thus for a time, their *Pain* and *Grief* ascended towards and above the *Stomach*, whereupon followed very violent and *Convulsive-like Motions* in their Bodies, especially about the *Stomach* and *Belly*, by which they were tossed and tumbled, and disturbed in the whole Body, with some *Foaming* at the *Mouth*, in the *interim* of their *Fitts*. Now and then these *Symptoms* continued and increased until the latter-end of *August*, that they were taken with the *Fear of Water*, and could not endure to look into any *liquid* thing, until the Cup was covered, but forthwith would have fallen down as *dead*, and so would have lain a little time as in a *swooning* or *dead Fitt*; and then would have tumbled and tossed in the foresaid violent *Motions* and *Distractions* of their Bodies, *moaning* and *groaning*; and ordinarily, the Eldest especially, *snarled*, *barked*, and endeavoured to *bite* like a *Dog*: They continued in this *Fitt* for an *Hour* sometimes, and sometimes less, and so came out of the *Convulsive-like Motions*, lying as it had been in a *Swoon*, a little before they came out of the *Fitts*; and when they did come out of the *Fitts*, would have cropen away in

a *feared* manner from any who had been by them: And thus within an *Hour*, or little more, they came so out of their *Fitts*, that they were also *well*, and as much themselves as ever. They remained under these *Symptoms* until the middle of *September*, every *Day* taking the said *Fitts*, in which they could not *speak*, and in their *Intermissions* were as towardly and as well in their *Wits* as ever; and 'twas observable, that they *both* took the *Fitts* and came out of them at the same time. But about the middle of *September*, about which time especially the *Barking* or *Snarling* like a *Dog* came, they became more *wild*; so as for some *Days* now and then, even whilst out of their torturing *Fitts*, they would not endure any *Company*, no, not so much as to come near one the other, and thus continued of this *Disposition* for a *Week*; and then the *Eldest* drew near his *Father*, saying, as one surprized, *Father, I am well*; and so he and the other became forthwith *well*, and could look into *Water* without any *Fear*, and so continued to be *well* for three or four *Days*, and after that fell *ill* again, and remained ill six or seven *Days*; at the end whereof they both became *well* as formerly on a *sudden*, and from that time continued *well*; only the *Eldest*, about the end of *January*, had some *Fitts* like the former.

Observe, that in *August*, there were *Doses* of *Antimony* and *Mercurius Vita* prescribed together with *Antidotes* of *Venice Treacle*, Powder of *Crabs Eyes*, and other things.

XXXIX. 1. Take. *Agrimony Roots*, *Primrose Roots*, *Dragon Roots*, Single *Peony Roots*, the *Leaves of Box*, of each a *Handful*; the *Star of the Earth* (or *Lychnis Viscosa flore muscoso*, *Casp. Bauhini*, or *Spanish Catch-Fly*) two *Handfuls*; the black of *Crabs Claws* prepared, *Venice Treacle*, of each one *Ounce*; all these are to be beaten and bruised together, and boiled in about a *Gallon of Milk*, till the *Half* be boiled away; then put it into a *Bottle*, unstrained, and give of it, about three or four *Spoonfuls* at a time, to the *Dog* or *Beast*, three *Mornings* together, before *New* and *Full Moon*. It will be necessary the *Day* before you administer the *Medicine*, to take away a little *Blood*. Some of these *Roots* and *Herbs* being difficult to be gotten in the *Winter*, they may be gathered in their *Season*, and being dried and well powder'd, may be given mix'd with the *Crabs Claws* and *Venice Treacle*, with *Sallet Oil* or *Butter*, and it will do as well.

For *Men* or *Women* that are bitten with *mad Dogs*; take the same *Ingredients* in the same *Quantities*; and the *Roots* and *Herbs* being bruised all together, with the *Crabs Claws* and *Venice Treacle*, let them be infused warm into two *Quarts* of strong *White Wine*, for at least 12 *Hours*. This being strained, the *Party bitten* is to take about a *Quarter* of a *Pint* *Evening* and *Morning*, three *Days* before the *New* and *Full Moon*; it may be sweetened, either with *Sugar* or some *Cordial Syrup*.

2. 1. Take *Virginia Snake-Root* and *Flowers of S. John's-Wort*, gathered in their *Prime*, equal *Parts* of each; let them be made into a very fine *Powder*. The *Dose* is from a *Scruple* to a *Dram*, and to be taken in any sort

Cures for mad
Dogs, or any
thing bit by
them; by Sir
Rob. Gordon. &c.
187. 298.

Several Re-
ceipts for the
Bite of a mad
Dog; by Sir
Theod. Mayerne,
n. 191. p. 409.

of *Decoction* prepared with *Specificks*. To a *Horse* give two *Drams*, to a *Dog* from 1 to 1 $\frac{1}{2}$ *Dr.* This before the 9th *Day* after the *Bite*.

2. Take *Leaves* of *Rue*, pick'd from the *Stalks* and bruised, 6 *Ounc.* *London Treacle*, (or which is better *Venice Treacle*) *Garlick* pill'd and bruised, and fine *Filings* of *Tin*, each 4 *Ounces*; put them in 4 *lb.* of *Canary*, or good *White Wine*; or in case of a nice or hot *Constitution*, into the same *Quantity* of *strong* and well work'd *Ale*, in an *Earthen Vessel* well stopp'd. Then let there be made a *Digestion*, or gentle *Boiling* thereof, in *Balneo* for 4 *Hours*, shutting in the *Steam*, then press it and strain it. The *Dose* is from 2 or 3 *Ounces* (and in some *Persons* more) to be taken every *Morning* for nine *Days*. The *Party bitten* must fast for three *Hours* after it, and the *Dregs* that remain after *Expression* must be bound upon the *Wound* received, renewing it every twenty four *Hours*. NB. That the 9th *Day* after the *Bite* must not be let slip, before this *Medicine* be taken, lest the *Poison* seize the *Blood* too strongly. It must be given cold, or at least only a little aired. A double *Quantity* may be given to a *Beast*, soon after the *Bite*.

I never found this *Remedy* to fail. *Theo. de Vaux.*

3. Pluck the *Feathers* from the *Breech* of an old *Cock*, and apply it bare to the *Bite*, and do this upon each of the *Wounds*. If the *Dog* were mad, the *Cock* will swell and die, and the *Person bitten* will do well; but if the *Cock* dies not, the *Dog* was not mad. If the *Wounds* be very small, it is requisite to open them with a *Lancet*.

4. Let the *Party* be nine times plunged in the *Sea*, while he is fasting, as soon as may be after the *Bite*. Let the *bitten Part* be washed with a *Lie* of the *Ashes* of *Oak-Wood* and *Urine*, and apply a *Cataplasm* of *London Treacle*, *Alliaria*, or *Hedge-Garlick*, *Rue* and *Salt*.

Take dried *Rue* and *Scordium*, each 2 *Dr.* *Virginia Snake-Root* 1 $\frac{1}{2}$ *Dr.* *Flowers* of *S. John's-Wort* 3 *Dr.* fine *Filings* of *Tin* and *Garlick* cut small, each 4 *Dr.* *London Treacle* 1 *Ounce*; let them be all beaten and exactly mix'd together, adding *Syrup* of *Lemon Pills* as much as suffices to make it into an *Electuary*; divide this into nine equal *Parts* to be taken every *Day* one, drinking after it a small *Draught* of good *strong Ale*. Let him walk upon it and not dine till 4 *Hours* after. Use as little of the aforesaid *Syrup* of *Lemon Pills* as may be: And if that be not at hand, a *Syrup* made of *Malaga Wine*, adding as much *Sugar* as it can dissolve, may serve the *Turn*.

Make up of this *Electuary* 4 $\frac{1}{2}$ *Ounces* at a time, that so the *Dose* may be half an *Ounce*.

A Cure for the
Bittings of a mad
Dog; by Mr.
Geo. Dampier.
n. 237. p. 49.

3. 1. I have sent you some of the *Herb* you desir'd. You must look for it in dry *Grounds*; light and sandy *Ground*, where *Sheep* feed, doth commonly afford it; but my *Uncle* preferr'd that that grows on good *Ground* before any other. It is a Sort of *Jews-Ear*, which grows on the *Ground* as close as may be to it, being flat on it; the *Moss* and *Grass* groweth up about and amongst it. To use it, you must dry it in an *Oven*, by the *Fire*, or in the *Sun*, then powder it, and pass it through a *Renge*, or fine *Sieve*; the which mixed with the like *Quantity* of fine beaten and powdered *Pepper*, is the *Composition*. When given to a *Dog*, the *Dog* must first be blooded, and then wash'd

washt well all over, the Dog being kept from Meat a convenient while before; then mix it well in a convenient Quantity of Milk or Broth warm. If it be for any Cattle, it must be also blooded and well washed, and given with a Drenching-Horn, and the Dose may be proportion'd to the Bigness or Strength of the Creature that is to take it. 1. To a Man or Woman, it must be given after Blood-letting, and well washing the Face, and Hands or Place that may be bitten, or all the Cloaths that a Person had on him or her when bitten, to wash away the Snivel or Drivel that comes from the Mouth of a Dog or other Creature when mad; for that is the only Reason for Washing. A Man or Woman may take it in warm Milk, Beer, Ale, Broth, or how he best likes it, fasting, two or three several Mornings to make sure.

After a Dog hath bitten Man or Beast, it will not appear or begin to grow mad till after a Full and New Moon, or New and Full; but when it begins to be mad, 'tis very hardly cured. Therefore when you know any thing to be bitten, or suspect it to be so, use the Remedy as soon as may be after, and then, when given in time, it prevents all Signs of Madness at all; which hath made some indiscreet People say, it did no Good, they believe it would have done well enough without it: But my Uncle hath fully confuted that Mistake several times, by not Drenching a Dog of small Worth in a Gentleman's Cry of Dogs, which hath died mad, and not one of the rest sick, but have follow'd their Master's Game rather better than before; and indeed being ingeniously prepared and given, 'tis a most noble and infallible Medicine. I was with my Uncle when a Dog had gotten in amongst a whole Herd of Cattle at Charnister by Dorchester, and had bitten some; which growing mad, and feeding together with their Fellows when mad, the Drivelling of them infected many more, and the Distemper continu'd almost all the Summer amongst them, still one or two dying and infecting more. The Murrain was at first suspected, and the Cattle were drench'd for that Disease. But my Uncle being sent for, he found three or four sick, which he could not cure; but order'd all the rest to be driven 3 or 4 times through the great River, and all put from the same Pasture, till after it should rain a good Shower or two, which would wash away the Snivel from the Ground; and then Drenching them prevented any farther Evil, for not one was sick afterward. The whole Herd was near 250, and about 40 died.

2. The Simple or Herb mention'd is not Jew's-Ear, but the Lichen Citerius Terrestris, describ'd by Mr. Ray. It grows commonly in barren Places all over England. The Weight of one single Dose of this Simple, and the Pepper mix'd, communicated to me by Mr. Southwell, with Mr. Dampier's Leave, is near 3iv.

A Remark;
by Dr. Hare
Sloane. lib. p. 52.
Hist. Plant.
p. 177.

XL. A judicious Person related to me, that being in the Country of Otranto, where the Tarantula's are found in great Numbers, there was a Man, who thinking himself stung by one of them, shew'd in his Neck a small Speck, about which, in a very short time, there arose some Pimples full of a serous Humour; and that, in a few Hours after, that poor Man was sorely afflicted with very violent Symptoms, as Syncope, very great Agitations, Giddiness of the Head, and Vomit; but that without any Inclination at all to dance, and without

Persons suppos'd to be stung by Tarantula's; by Dr. Tho. Cornu-lio. n. 83. p. 4066.

without all Desire of having any *Musical-Instruments*, he miserably died within two Days.

The same Person affirmed to me, that all those that think themselves bitten by *Tarantula's*, (except such, as for some Ends fain themselves to be so) are for the most part young wanton Girls, (whom the *Italian* Writer calls *Dolci di Sale*) who by some particular Indisposition falling into this *Melancholy Madness*, persuade themselves, according to the vulgar Prejudice, to have been stung by a *Tarantula*. And I remember to have observ'd in *Calabria* some Women, who, seized on by some such Accidents, were counted (according to the common Belief of that Province) to be possess'd with the Devil.

This brings to my Mind a terrible Evil, which often enough is observed in *Calabria*, and is called in their Language *Coccio Maligno*. It ariseth on the Surface of the Body, in the Form of a small Speck, of the Bigness of a Lupin. It causeth some Pain, and if it grow not soon Red thereupon, it in a very short time certainly kills. 'Tis the common Opinion of those People, that such a Distemper befalls those only that have eaten Flesh of Animals dead of themselves; which Opinion I can from Experience affirm to be false. So it frequently falls out, that of many strange Effects we daily meet with, the true Cause not being known, such an one is assign'd which is grounded upon some vulgar Prejudice: And of this Kind I esteem to be the vulgar Belief of the Cause of that Distemper, which appears in those that think themselves stung by *Tarantula's*.

A Continuation
Jaundice attend-
ed with an odd
Case in Vision;
by Mr. Samuel
Dale. n. 211.
p. 158.

XLI. I here send you an Account of my Patient *Grace Dennis*, of *Braxted Magna*, in this County of *Essex*. About *Christmas* 1689, after much Grief and Trouble of Mind in the foregoing Autumn, the *Jaundice* began to appear upon her; for which, after having about 9 Months used many Medicines, which were told her by divers of her Friends and Acquaintance, but without Success, she, in *Sept.* 1690, apply'd herself to me, to whom I administred divers Medicines, famous in the most celebrated Authors for the Cure of the *Jaundice*, and which I had often used with Success in the Cure of that Disease; yet to her they were of no Benefit. After which, she had the Advice of several Learned *Physicians* in the Country, and likewise some in *London*: But all that could be done for her hath not yet had any Effect; for her Disease yet continues, and her Body, which used to be plump and fleshy, is now become lean and emaciated, almost like a *Skeleron*, and her Appetite is little and depraved.

In *May* 1691, after an extraordinary *Menstrual Flux* for about 3 Months, she began, as soon as the *Sun* was down, to be deprived of her Sight by degrees, until it was quite dark; when altho' never so big a Fire or many Candles were in the Room, yet could she not discern the Object, (except a small Shining of Light) and so she remained until the Morning as one stone blind; when by little and little, as the Light increased, her Sight return'd, until the *Sun* arose, and then she recover'd her perfect Sight.

And in this Case she continu'd until *August* 1692; when being return'd from *Epsom*, where she had been drinking the *Waters* for about a Month, her

Sight

Sight returned to her again, so that she could see in the *Night* perfectly. Thus she continued until *January* following, when an extraordinary *Menstrual Flux* again seizing her, her *Nocturnal Sight* likewise left her, and she became *blind* as formerly.

In *July* 1693, she was seized with a *Fever*, when her *Sight* again returned, and continued for about a *Month*, and then left her as formerly; so that now in *October* 1693, she hath her *Nocturnal Blindness*, and the *Jaundice* likewise continues.

XLII. 1. One Mr. Morely, of *Bury S. Edmunds*, in an *Asthmatick* Distemper, was advised by some to take down a Spoonful of good *Englisb Honey*; which being done, the Patient fell into an universal *Swelling*, as if he had swallowed the worst of *Poisons*. Mr. Goodrich (who is my Author) prescribed a common *Sudorifick*, which in competent time relieved him. And that they might be assur'd that there was nothing amiss in the *Honey*, they afterwards got the like Quantity at another Place, which was given with the very same frightful Event, and the Party was cured with the same kind of *Sweat*.

Dieters Instances of Peculiarities both in Men and Brutes; by Dr. Nath. Fairfax. n. 29. p. 549.

The like Example hath been more than once related to me by a very credible Person of a Noble Lady in *Ireland*, who having received a small *Hurt* on her Leg, and the Chirurgeon (unknown to her) mingling in the Application he made to it a little *Honey*, (for which she had an utter *Aversion*) the Place affected did soon after rankle and grow so bad, that the Lady was constrained to send for him that had applied it, who being acquainted with her *Antipathy* to *Honey*, immediately removed that *Plaster*, and apply'd another with good Success.

By Mr. Oldenburgh. lb.

2. Mr. Twisse, a Minister of *Metigham* in *Suffolk*, about 40 Years of Age, having been accustomed for some time to drink warm or rather hot *Beer*; being abroad about *Midsummer*, took off a Cup of cold *Beer*, after he had taken a Pipe of *Tobacco*. He soon after found himself sick, and vomited; and coming home, his *Vomiting* grew worse, and he was constrained to betake himself to Bed. Next Day he grew yet worse, and could find no Help by Physick, but died the very next Morning. And yet I am informed, that the same Party could drink cold *Wine*: So that it was not the Coldness of Particles sensible to the Touch that kill'd him.

By Dr. Fairfax. lb.

3. Madam Mary Brook, of *Yoxford*, hath such an *Aversion* to *Wasps*, that whilst their Season of Swarming about in Houses lasteth, she is forced to confine herself to a little close Chamber, and dares not then come out to Table, lest their coming there should put her into such *Distempers*, as Cheese doth those who have an utter *Antipathy* against it.

4. Mrs. Raymund of *Stow-Market*, whenever she hears *Thunder*, even afar off, begins to have a Bodily Distemper seize on her; she grows faint, sick in her Stomach, and ready to vomit. At the very coming over of it, she falls into a down-right *Cholera*, and continues under a violent *Vomiting* and *Looseness* as long as the *Tempest* lasts. And thus it hath been with this Gentlewoman from a Girl.

5. I know a Woman in *Stow-Market*, who during her *Green-Sickness* was invited by her *Pica* or *Longing* to suck the *Wind* out of *Bellows*, which, as often as she could, she took into her Body with open Mouth, forcing it in, by blowing with her own Hands the *Bellows* inverted. I know another that was for *Crackling Cinders* under her Feet. From which kind of Instances I am inclin'd to doubt, whether that Distemper begins at the Depravation of the Acid Liquor in the *Stomach*, and not rather at the *Uterus*, which next infects the *Brain*; such kind of things gratifying the *Fancy* some ways mislead, more than the *Appetite Natural* any ways depraved.

6. Something like to this is to be found in *Brutes*. In May 1667, a *Greyhound Bitch*, at *Britewell-Hall*, about 5 or 6 Days before she cast her Whelps, had such a wild kind of *Hunger*, (though she was fed sufficiently every Day with usual Food) that finding another *Bitch's Whelps*, she devour'd them all, and fell next upon the *Bitch* herself, who made a shift to get from her. From this, and from a *Sow's devouring* whole Litters of Pigs, I am prone to think otherwise of the *Longing* of *Teeming Women*, than is the common Opinion.

Several Observations on different Maladies; by M. Gaillard. N. 333. p. 717.

XLIII. 1. There was seen at *Toulouse*, about the Year 1685, an Infant who had 2 Heads; one was a sort of a Bag, resembling the Hood of a *Benedictine Monk*, and was fasten'd to a Neck of the same Length with the Neck of the other Head. Mr. Peter, Sworn Surgeon, open'd it in Presence of Mr. Bayle and Mr. Corboneau; the Waters being let out, the Swelling vanish'd; the Neck did not so: That Part of it which was next to its Original, and which had about the Length of two Inches and an half, was made up of *Flesh*. This Child lived fifteen Days.

2. In the Suburb S. Cyprian, near to the Hospital of S. Joseph of Grace, Mr. Soye, a skilful Surgeon, having open'd the Daughter of a Cap-Maker, dead of the *King's-Evil*, April 1685, remark'd, that the Glands of the *Mesentery* were petrified; most of them were about the Bigness of a Walnut, and others of a Small-nut; in some of them, being open'd, he found about a Dozen of Stones.

3. Mr. Bousquet, Citizen of *Toulouse*, being dead, on the 8th of Mar. 1686, of a continual Fever, and a Spitting of Blood, accompany'd with a Difficulty of Breathing; Mr. Delpesch, Sworn Surgeon, open'd him, and found in the Right Kidney 3 little Stones, and some Gravel: Going down the Ureter, which was much enlarg'd, he found a tough Stone, of the Bigness of a Bean, lodg'd towards the lower Orifice of the same Passage: The Lungs stuck to the Pleura, to the Mediastin, the Diaphragm, and Pericardium: The Wind-Pipe was full of Blood. There was seen in the Left Lobe, and the back Part of the Lungs, a Bony Substance 2 Inches long, and half an Inch broad: There were two Polypus's in the Heart, one in each Ventricle, of the Bigness of a Pigeon's Egg, whose Roots were 10 Inches long: The Vena Cava, both Ascendent and Descendent, was cover'd at its Entry into the Left Ventricle of the Heart with a Bony Matter.

4. M. Soye having in May 1689, opened the *Vena Basilica* of the Right Arm of Madam de S. Paul, a Religious of the Hospitalers of Paris, observed a little black Blood that stopp'd the Orifice he had made, and being willing to take it away to open the Passage, he found that it was a *Polypus* ten Inches long.

5. In Sept. 1687, the Sieur Soye having, in the Hospitalers, opened a Servant-Maid, aged between 25 and 26, which was from time to time seized with a *Bloody Flux*, he found the Colon and part of the *Mesentery* ulcerated. The Mouth of this Ulcer was so great, that one might easily thrust in his Fist at it. It was stopp'd with a Clew of *Worms* greater than it.

6. There happened much about the same time a Passage, singular enough, in that Monastery; M.——having stopp'd on a sudden a Flux of Blood in Madam Maria, who had her *Catamenia*, (though she had a continual Fever and a Bleeding at the Nose) before he had used general Medicines, she fell all on a sudden into an *Apoplexy*, and dying quickly after, M. Soye opened her, and found in the Lateral Sinus, which divides the Brain from the *Cerebellum*, a Clot of Blood as big as a Hazel Nut. All the Vessels of the Brain were very much swelled and full of Clotted Blood: As for the *Ventricles*, they were full of a Serous Humour, being about the Quantity of a Setier.

7. Madam le Gendre, who died a Maid of 18 Years old, about the end of Nov. 1693, was subject to great Head-aches, and almost continual Faintings, and *Convulsive Fitts*; and the two last Years of her Life, she was so strongly seized with them, that she became blind of them, and continued in that Condition two or three Months. After Death, she was opened by M. Soye; and when he came to the Gray Substance of the Brain, he found above the *Ventricles*, between the Cortical Substance and the Callous Body, a Lump of Flesh, resembling the Stomach of a Goose. Immediately after the Callous Body, in the foremost *Ventricles*, did appear an Ulcer, from which came out about a Setier of Matter.

8. In the beginning of Sept. 1696, M. Soye opening the Gall-Bladder of a Widow of 19 Years old, he found there a Stone altogether like a Hen's Egg; that Part of the *Livor* which was near was hurt, and her *Matrix* schirrous. She had for two Years the Yellow Jaundice.

9. The same M. Soye having, in Sept. 1696, opened a Child of M. Roze, Notary, found in the *Ventricles* of the Brain a Setier of Water.

10. In another Child of M. Hugonien, Woollen-Draper, which he opened much about the same time, and which was about two Years old, he found in the Right Ventricle of the Heart a *Polypus* as big as a Pigeon's Egg, and in the Left Ear Coagulated Blood of the Bigness of a Walnut; he found moreover in the little Lobe of the Lungs two Ulcers very distinct, from each of which there issued a Setier of Matter. The Ureter of the Left Kidney was distended an Inch, and its Passage stopp'd by Phlegm, so hardened, that scarcely could a Knife cut it.

11. Madam de l'Escarre, about 26 Years of Age, and subject to great Diseases, was opened in the beginning of Oct. 1695, by M. Soye; he saw

the Vessels that brought the Blood to the *Membranes* of the *Brain*, were greatly swell'd, and full of *Polypus's*; of them we drew out 12, some four *Inches* long, and some three.

12. In the Beginning of this Year, 1697, the Wife of M. *Mafoc*, Merchant, being 40 Years old, who had four or five Children, had the same *Symptoms* which happen to Women near their *Labour*. M. *Soye* was call'd to her, and seeing that she suffered such a Loss as happens to Women before their bringing forth, or upon some Hurt, made ready for *Laying* of her. We saw presently a *false Conception*, which appear'd at the inner Orifice of the *Matrix*; this he pulled out, perceiving it loose from its Ligaments. This *false Conception* was of the Bigness of a Goose Egg, and shaped like a *Kidney*. There was also so great a Similitude between the Structure of the *Kidney*, and this Mass of Flesh, that the Fibres were wholly alike. This Woman said, that this *false Conception* had been two Years in her *Matrix*. After it was out, she had the same Loss of Blood, as in her other *Lyings-in*; and keeping to the same Course as she used in such Occasions, she had no bad Consequences of it.

13. There was observ'd in a Child, newly born, and in due time, that it had nothing of the *Bone* in the Hind-Part of the *Head*, the *Temporal Bones*, nor of the *Frontal Bone* as far as the *Eyes*; so that the *Eyes* made an Appearance of two Horns, which the Calves have when they come into the World; which standing much out, made the Child's Face very *Monstrous*. In the *Temporal Bones*, there was nothing seen but what enclosed the Organ of *Hearing*; upon laying the Hand upon it, was felt the *Beating* of the *Arteries*, and the Vessels which watered the *Pia* and *Dura Mater* were seen distinctly, as if the *Bone* had been taken off. This Child lived in this State four or five Days.

14. M. *Soye* the Younger, a Surgeon, having opened a young Girl, found her *Matrix* so *schirrous*, that it seemed to be made but of one Piece.

15. The same observ'd since such a thing in a Girl two Years old, that died of an *Apoplexy*; he found also 4 Glands in the *Mesentery* of this Maid, each as big as a Walnut. He has since seen that the *Mesentery* of a Child 7 or 8 Years old was made of 2 Glands, each of the same Bigness.

16. M^r. *Barriere*, Sworn Surgeon, found in a Girl 11 or 12 Years old, instead of a *Matrix*, a very thin *Membrane* placed where the *Matrix* is. The *Vagina* in the outward Orifice was shut up *Hermetically*; i. e. the Cover was of the same Piece with the *Matrix*.

17. M^r. *Carlan*, Sworn Surgeon, having observ'd in a Man a Swelling, as big as a Pullet's Egg, upon the Place called *Fonsanella*, and covered with Hair like the rest of the Head, apply'd to it *Emplastrum de Betonica*, by Order of M. *Dufaur*, Professor of Surgery, and the Swelling disappear'd.

XLIV. Papers of Less General Use, omitted.

35. P. 672. 1. Several Anatomical Inventions and Observations asserted to their proper Authors; by Dr. Tim. Clark, viz. 1. Of

1. Of the *Vasa Lactea*, to *Asellius*.
2. Of the *Ductus Thoracicus*, to *Pecquetus*.
3. Of the *Vasa Lymphatica*, to *Bartholinus* and *Rudbeckius*; yet these *Lymphatics* were observed in the *Testicles*, by *Jolive*, some time before.
4. Of the *Circulation of the Blood*, to *Harvey*, not to *P. Paulus Venetus*.
5. Of the *Injection of Medicated Liquors* and other things into the *Veins* of Animals, to *Sir Chr. Wren* about the latter end of the Year 1656, if not to *Dr. Potter* about 18 Years before.
6. In the Prosecution of this last kind of *Operations*, both *Dr. Clark* and *Dr. Henshaw* attempted about that time the *Transfusion of Blood* from one Animal into another, but unsuccessfully, till *Dr. Lower* hit upon a more practicable Method, and perform'd the *Operation at Oxford*. Ann. 1666.
2. Several Historical Passages concerning the *Invention of Injection* into the *Veins*, and *Transfusion of the Blood of Animals*, by *Mr. Oldenburg*: Where the *Invention* of the first is given to *Sir Chr. Wren*, and the *successful Practice* of the latter to *Dr. Lower*; except this Honour may be allow'd to *Livobavius*, who indeed describes the *Operation upon Men* plainly enough, (in his *Defensio Symptomatis Arcanorum Chymicorum*, &c. p. 8. Edit. An. 1615.) but 'tis only to mock at it.
3. Queries and Trials propos'd by *Mr. Boyle* to *Dr. Lower*, to be made by him, for the Improvement of *Transfusing Blood* out of one *Live Animal* into another.
4. A Letter from *M. Gasper de Guyre de Montpoly* to *M. Bourdelot*, concerning necessary *Circumspection* to be used in the Practice of *Transfusion upon Men*.
5. The *Cautious Proceedings of the English* in the Practice of *Transfusion upon Men*.
6. A Printed Letter of *M. Gadroys* to *M. Bourdelot*; being an Answer to a Paper of *M. Lamy*, and a Vindication of the *Transfusion of Blood* from his Objections.
7. A Printed Paper, written by *J. Denis*, touching a late Cure of an inveterate Phrensy by the *Transfusion of Blood*; and the Proceedings of the Court of Justice at Paris upon the Death of the Man, after he had undergone that Operation twice or thrice.
8. Experiments of *Scatching Blood* with the *Royal Sympique*; extracted from *M. Denis's 11th Conference*, Printed in French at Paris, April 30. 1673.

XLV. Accounts of Books omitted.

1. **M**emoirs for the Natural History of *Humane Blood*, especially the Spirit of that Liquor; by the Hon. *Rob. Boyle Esq*; Lond. 1683.
2. *Apologia pro Circuitione Sanguinis*; qua respondetur *Æmilio Parisano Medico Veneto*: Auth. *Geo. Entio*. Editio altera, auctior & accuratior. Lond. 1685. in 8vo.

- n. 58. p. 1200. 3. *Joh. Sig. Elsholtii Clysmatica Nova*; five Ratio in *Venam Sectam Medicamenta immittendi. Colonia Brandenburgica*, 1667. in 8vo.
- n. 4. p. 75. 4. *Diatribæ Th. Willisii. M. D. & Profess. Oxon. de Febribus, Vindicatio. Authore Rich. Lower.*
- n. 12. p. 210. 5. *Dr. Sydenham's Methodus curandi Febres, propriis Observationibus superstructa.*
- n. 123. p. 568. 6. *Observationes Medicæ circa Morborum Acutorum Historiam & Curationem. Auth. Thom. Sydenham. M. D. Lond. in 8vo.*
- n. 197. p. 657. 7. *Novæ Hypotheseos, ad explicanda Febrium Intermittentium Symptomata & Typos excogitata: Hypotyposis: Una cum Ætiologia Remediorum, speciatim vero de Curatione per Corticem Peruvianum. Accessit Dissertatiuncula de Intestinorum Motu Peristaltico. Auth. Gulielmo Cole, M. D. Lond. 1693. in 8vo.*
- n. 199. p. 717. 8. ΠΥΡΕΤΟΛΟΓΙΑ; seu Exercitationes de Morbis Universalibus Acutis. Auth. Rich. Morton, M. D. Lond. 1692. in 8vo.
- n. 217. p. 123. 9. *Archibaldi Piscarnii, M. D. Dissertatio de Febribus.*
- n. 73. p. 2210. 10. *Dissertationes duæ Medicæ de Veneno Pestilenti: Studio Caroli de la Font, M. D. & in Acad. Avenion. Prof. Primar. Amstel. in 12mo.*
- ib. p. 2212. 11. *Franc. de le Boe Sylvii, M. D. Oratio de Affectus Epidemici, Anno 1669, Leidam Depopulantis, Causis Naturalibus. Ludg. Batav. 1670. in 12mo.*
- n. 81. p. 4038. 12. Ασπυλογία; sive Pestis nuperæ Londini grassantis Narratio Historica. Auth. Nathan. Hodges, M. D.
- n. 101. p. 74. 13. *Medicina Militaris; or a Body of Military Medicines experimented, by Raymundus Mindererus. English'd out of High Dutch. Lond. 1674. in 8vo.*
- n. 136. p. 918. 14. *Tractatus Medicus de Morbis Castrensis Internis. Auth. Joh. Valentino Willio. Hafnia, 1676. in 4to.*
- n. 226. p. 475. 15. *An Account of the Nature, Causes, Symptoms, and Cure of the Distempers that are incident to Sea-faring People; with Observations on the Diet of the Seamen in his Majesty's Navy: Illustrated with some remarkable Instances of the Sickness of the Fleet, during last Summer, Historically related. By William Cockburn, M. D. 1696. in 8vo.*
- n. p. 478. 16. *A Continuation of the Account of the Nature, Causes, Symptoms, and Cure of the Distempers that are incident to Sea-faring People. Illustrated with some remarkable Instances of the Sickness of the Fleet, during last Summer, Historically related. To which is prefix'd, an Essay concerning the Quantity of Blood that is to be evacuated in Fevers; being the 3d Part of the Work. By Will. Cockburn, M. D. Lond. 1697. in 8vo.*
- n. 228. p. 545. 17. *Marcelli Malpighii Opera Posthuma; Fig. æneis illustrata: Quibus præfixa est ejusdem Vita à seipso scripta. Lond. 1697. in Fol.*
- n. 226. p. 470.

C H A P. VI.

The Bones, Joints, and Muscles.

I. I Have lately seen in France Part of an Humane Skeleton, consisting of the *Os Ilium*, the *Os Sacrum*, the five *Vertebrae* of the *Loins*, ten of the *Back*, five entire *Ribs* on the Right Side, and three on the Left; the Bottoms or Ends of the other were closely united to the transverse *Apophyses* of their *Vertebrae*: The *Vertebra* of the Neck, the *Clavicula* and *Sternum* were wanting. The Bones of a Skeleton united without Jointing or Cartilage, by Dr. Bernard Connos. n. 215.

All these *Bones*, which naturally are thirty eight, each separate and distinct from another, were here so streightly and intimately joined, their Ligaments perfectly bony, and their *Articulations* so effaced, that they really made but one uniform continuous Bone; so that it was as easy to break one of the *Vertebra* into two, as to disjoint or separate it from the other *Vertebra*, or the *Ribs*, or the *Os Sacrum* from those of the *Ilia*. Nor could I observe any greater Distinction between all the *Bones*, than is usually seen in adult Persons between the *Os Pubis*, the *Ischion* and *Ilium*, which are but one entire bony Substance. The Roots of all the *Ribs* made but one equal, smooth, and plain Superficies with the *Vertebra* and their *Apophyses*. The Oblique *Apophyses* of all the *Vertebrae* were so confounded and lost, that it was not possible to observe any Marks of them. The Cartilaginous Edge of the *Vertebra* themselves was turn'd to perfect Bone. But when I had saw'd two of the *Vertebrae* asunder at the *Commissure*, I found this Uniting did not enter above two Lines deep, and that afterwards their Middles were separated as they usually are, and touched each other only at the Edges, which was raised up a little above the middle Part. On the Left Side, at half a Finger's Breadth from the *Vertebra*, two *Ribs* were joined together for the Space of an Inch, and afterward ran separated and parallel like the rest to the *Sternum*. The Figure of this *Trunk* was crooked, and making Part of a Circle, the *Spina* making the Convex, and the Inside of the *Vertebrae* the Concave Part of this Segment. The Direction of the *Ribs* was unnatural; for instead of terminating at the *Sternum* in parallel Semicircles nearly Horizontal, their Extremities, where they reached the *Sternum*, dipp'd so much down toward the *Hypogastrium*, as to touch the Sides of the *Ossa Ilium*.

This *Trunk* had been found in some Church-Yard or Charnel-House, as appeared by its dark red Colour and Dryness, and seemed to be of a grown Person, the *Bones* being of a Proportion and Thickness equal to those of old Men. The *Vertebrae* of the *Loins* were larger than those of the *Back*, as they naturally are; there was no unnatural Bunching out, their Joining together very regular, no one *Vertebra* standing out beyond the other, either before, behind, or on the Sides. The Cavity for the *Spinal Marrow* had no Fault but its bending Figure. The *Bones* of the *Os Pubis* were separated as usually. The *Socket*, or Cavity, of the last *Bastard Rib* on the

Right

Right Side being smooth and polish'd, seem'd as if that *Rib* had not been so firmly united as the rest. In the Extremity of the *Ribs* next the *Sternum*, the usual Cavities for the *Cartilages* to move in were observable, which, as it seems by this, were not *Bony*, nor continuous with the *Ribs*. It is hard to give a Mechanical Reason of this so secret and hidden a Matter. That these *Bones* were thus united after the Death of the Person in the Ground, is hardly to be allowed. Pure Earth, being made up only of friable, porous, irregular Particles, can but suck up the superficial Moisture of the *Ligaments* of this *Trunk*; otherwise, by Evaporation in the Sun, *Ligaments* and *Cartilages* would become *Bony*; and the *Earth* is never so Styptique as to procure so intimate an Union. If you will say the *Earth* was impregnated with some Principle capable to produce this Effect, it must be either *Water*, *Sulphur*, or *Salt*; neither of which seem proper to cement *Bones*: All knowing, that *Water* and *Sulphur* are so far from hardening *Ligaments*, that they rather soften and relax by their slippery and fluid Particles. Nor are *Alkali's* or *Acids* capable to turn them to *Bone*. For *Alkali's* being bristly, stiff, and inflexible, are properer to separate than unite; as is seen by putting a Piece of *Ligament* into any *Alkaline Salt*. And, Secondly, *Acids* are most proper to break the Texture, and divide even the hardest Bodies; and upon Experiment, *Cartilages* are dissolved in them; besides, could this Effect have been produced in the *Earth*, why was not the whole Body turned to *Bone*?

As to the Crooked and Bending Shape of this *Skeleton*, it is reasonable to suppose that it proceeded from the first Formation of the *Fœtus* in the *Womb*, from the *Egg's* not having sufficient Room, or being accidentally press'd by some *Abscess* in the *Womb* or elsewhere; so that the *Carina* of the *Back-bone*, instead of running streight, was bent into a Circle, and kept the same Figure when at full Growth, that these *Bones* had taken when soft and tender. Hence the Situation of the rest may be fairly deduced; as the drawing down of the *Ribs* and *Sternum* to the *Ossa Ilium*. And from these *Vertebrae* and other *Bones* being thus press'd upon each other, and so rendred unmoved, the Cause of their being united into one *Bone* might be this: The *Pores* of such tender Parts being easily stop't, so that the Blood and other Humours could not pass, and upon that account the *Cartilages* of the *Vertebrae* becoming dry, united into one Piece. By the same Reason, the *Ribs* being press'd against the *Vertebrae* for several Months, and without Motion in the *Womb*, could receive and admitt little or no Moisture between them; whence their *Cartilages* became hard and united, and in time *Bony*, as several other *Bones* of the Body do, though they were but *Gristles* when in the *Womb*.

From this Construction of the Parts it necessarily follows, that the Body of this Person must have been immovable; that he could neither bend nor stretch himself out, rise up nor lie down, nor turn upon his Side, having only the Head, Feet and Hands movable. If it be objected, that *Respiration* could not be perform'd when the *Ribs* were thus immovable; this Difficulty may be obviated, by observing, how little Motion of the Breast is necessary to continue the Motion of the Blood through the *Lungs*, as is visible

ble in *Hysterick Fitts*, &c. Again, the *Ribs* of this *Skeleton*, though fix'd at the Center, might yet be moved at the Ends, and so the *Thorax* enlarged by a much less Strength than that of the *Muscles* used for that purpose: Besides, the *Diaphragm*, the chief Organ of *Respiration* in this Subject, was free in the acting. But it is likely this Person *breathed* very *short*, the Quickness of the Returns supplying the Defect of a large Draught of *Air* at once: And possibly the *Foramen Ovale* might continue open, and that by it and the *Arterial Canalis* the *Blood* might pass from the *Cava* to the *Aorta*, but a Part of it passing through the *Lungs*; as I have lately observed in a Girl of 4 or 5 Years old, in whom the *Foramen Ovale* was but half closed up, and in the Form of a *Crescent*.

To this may be added another Observation of the *Bones* of the *Thigh* and *Leg* growing together in an Adult Person, the Place of their *Joining* being much more solid than any other Part. These *Bones* were so bent at the *Knee* as to make an *Acute Angle*, yet were they without any *Exostosis*, *Rottenness*, *Fracture*, or unnatural Figure. It is more surprizing to find the *Knee*, whose Motion is free and large, to be thus united, than the *Ribs* of the *Skeleton*, whose Motion is obscure and scarce sensible. Some thought that this might proceed from an *Ulcer* in the *Knee*; but an *Ulcerous Matter* is very unfit for the *joining* of the *Bones* together; and I have observed an *Ulcer* in the *Knee* making such Havock, that the *Thigh* and *Leg* hung together but by the *Skin*. These *Bones* seemed too sound to suppose the Person had a *Wooden Leg*, which by continual kneeling upon, might make the *Bones* unite; besides, this Accident is no more likely to befall a Person using a *Wooden Leg*, than any other, since the *Musculi Flexores* and *Extensores Tibia* act alternately in each Step, which is sufficient to hinder the Growing together of the *Joint*.

This Union of the *Bones* seems also to proceed from some Accident in the Womb; perhaps the *Knee* of this *Fetus*, being too much bent and press'd against the *Thigh-bone*, was hereby united, after the same manner as we have before explained that of the *Back-bone* and *Ribs*.

Fig. 76. *a a a a*, *b b b b*, *c c*, The *Vertebra* of the Neck, Back, and *Ossa Ilium*, all joined together. *d d d d*, Several of the *Ribs* united to the *Back-bone*.

Fig. 77. *g g g*, The Place where the *Os Femoris* and *Tibia* were united.

Explication of
the Figures.
Fig. 76.
Fig. 77.

II. 1. *Nicolas Brodes*, of 30 Years of Age, having been afflicted for the Space of 10 Years with an incessant *Head-ach*, (which for the last 12 Months before his Decease had been more violent than formerly, and deprived him of his Sight) upon the 15th of March, 1697, was received into the *Hôtel Dieu*. After his Head was shaved, there appeared a large *Tumor*, which extended itself over the Hairy Scalp. In the midst of the Left *Parietal-bone*, there was the Pulsation of an Artery, and a small Fluctuation, the rest of the *Tumor* being exceeding hard. *M. Dupré* fearing this might be an *Aneurysm*, was unwilling to open the *Tumor*, till he was constrained to it, by the importunate Intreaties of the Patient, who chose rather the Hazard of his Life, than any longer to endure so exquisite a Torment. As soon as an Aperture was made, there issued out a quantity of thick Concreted Blood, which

Bony Excrescences on a Human Skull; by M. Dupré. a. 1711. p. 128.

wet

wet the Bolsters at every Dressing. The 3d Day, he felt a hard Body with his Probe loose in the Flesh, which being taken out, appeared to be a small Fragment of a Bone exfoliated, resembling a small Comb-brush. Upon the 4th Day the Patient died. In Dissecting the Head, the *Tumified* Part of the Skull appeared to rise more than an Inch above the Sound Bone. The whole Swelling of the Cranium was made up of several Substances, not unlike little Horns, or innumerable small hollow Cones, with their Points downwards; besides a great Number of *Bony Fibres*, streight, stiff and pointed, resembling the *Teasels* used by Cloth-workers. In the next place there were several *Holes*, some of which perforated the Skull, others not. There was no Distinction of the *Sutures*. The *Meninges* were mortified and confounded together, and in part adhered to the *Bony Excrescencies* of the Left *Parietal Bone*; nevertheless the *Brain* was found and entire. The Inequalities of the inner Surface of the Cranium resembled melted Metal poured down from a considerable Height, on a light moving Sand; or the Inside of a *Grotto*, in which the Stones jet out in an irregular manner. The whole Left Side had lost its natural Figure, and the Right had only a few Impressions, made by the beating of the *Arteries* of the *Dura Mater*.

There was no appearance, on an exact Search, of any *Venereal Distemper* to be found, whence these *Excrescencies* might be suspected to proceed. It is therefore probable that the Blood-Vessels of the *Diploe* might be burst by some accidental Blow on the Head, or eroded by some Acidities of the Humours, and the Blood be extravasated in its Cells: This stagnating, and by Degrees arriving to a very high Degree of Corruption, it is not much to be admired that the more ponderous Part (by its great Acidity) should dissolve the contiguous Bone; and after it has penetrated that, by eroding such nice and sensible Membranes as the *Pericranium* and *Dura Mater*, cause exquisite Pains.

To explain these Irregularities of the Skull, it may be considered, that its upper Plate is composed of *Strata* of *Bony Fibres*, lying parallel to each other, and of an Arched Figure. Now when the Volatile Acid sublimes, and dissolves one End of the *Bony Fibre*, it must, by its Elasticity, spring up and become erect on the other. If more of these happen to have those Ends which remain on the Cranium around one Point, they form the small *Cones* above-noted, by means of a *Viscous Water* which cements them together, and fills up their Interstices: On the contrary, if they start separately, they form a *Capillary Appearance*.

Remarks on
these Excrescen-
cies, by Mr.
Will. Cowper,
in p. 140.

2. *Excrescencies*, not unlike this of the Skull, have been observed in most other Bones of the Body (the *Os Petrosum*, *Incus*, *Malleus*, *Stapes*, &c. not excepted) and the Disease is commonly called *Spina Ventosa*. It is remarkable, that the Bones of Children and Young Bodies (especially their Appendages) are more subject to the like Accidents, than those in Years; by reason their *Fibrilla* are much softer and apt to extend, whereby that Part of the Bone itself grows tumid, and frequently becomes *Carious*; and this probably might give Occasion for imposing the Name of *Padarthbrocace* on that Disease, which is vulgarly called the *Join-Evil*. When the *Cartilages* on the Extremities of Bones in their Articulations are eroded, (and their Appendages thus diseased)

the

the *Bony Fibres* sometimes germinate and unite both Bones, in such a manner that they afterwards appear to be one continued one, as I have seen in the *Hip* and *Thigh-bone*, and again in the *Thigh-bone*, the *Tibia* and *Patella*, and frequently in the *Ossa Tarfi*, *Metatarsi* and *Bones* of the *Toes*; many Instances of which are mention'd by Writers, in the *Vertebra* and other *Bones*. This *Union* of *Bones* at their *Articulations* may also happen through a Defect of the *Mucilage*.

The *Germination* of *Bony Fibres*, after any *Peccant Matter* has destroy'd some of them, and relaxed others, is no more surprizing, than the *Fleshy Inequalities* we commonly meet with in hollow *Ulcers* of the softer Parts, as in the *Membranes*, *Muscles*, *Glands*, &c. Besides the *Inequalities* on the Surfaces of *Bones* thus affected, and their being very much distended, I have frequently seen divers large *Holes* in them; (besides those for the Transit of the *Blood-Vessels*) some of which have pass'd quite through them. The like has been observ'd in both *Tables* of the *Skull*, as *M. Dupre* has taken Notice, where Part of the *Bone* has been dissolved into an *Ichorous Matter*, which sometimes has happen'd, and the *External Teguments* not been injured.

Phil. Anat. of
Human Bodies.
Tab. 93. and
Introd.

III. 1. *Joseph Shute*, Clerk, Parson of *Mary* (nigh *Plymouth*) in the County of *Devon*, aged 81 Years, being a temperate Man, and of a healthy Constitution, perceiving that his Mouth, about 3 Months ago, was somewhat streightned, found that he had a *New Tooth*, (the 3d Grinder) being the innermost of the upper Jaw in the Right Cheek, which still remains firm.

New Teeth in
Aged Persons;
by Mr. Coleprest.
n. 21. p. 380.

2. *Mary Stert*, of *Benecliffe*, in *Plympton S. Mary* (near *Plymouth*) in *Devon*, aged about 75 Years, an healthy Person, having had 9 Children, about the 40th Year of her Age, lost 3 of her upper *Incisors* or *Cutters*, the other drawn out, and so remain'd *Toothless*, as to them, for about 25 Years, when she perceiv'd that a *New Tooth* came forth (without any Pain) next the *Canini* of the Left Cheek: And about 2 Years after, another *Tooth* grew out likewise without Pain, close by the former. The first whereof never came to above half the Length of her former *Cutters*, the latter scarce breaking the Skin: Both which yet proved serviceable, till about 6 Weeks since, when she eating (no Hard, Crusty, or Solid) Meat, that *Tooth*, which came out first, fell down into her Mouth, without any Looseness before-hand perceiv'd, or any Pain; which had not a *Phang* like other *Cutters*, but much less and shorter. The other abides firm and serviceable.

IV. In the *Pall-Mall* at *London*, liv'd one *Clarke*, call'd the *Posture-Master* that had such an absolute Command of all his *Muscles* and *Joints*, that he could *Disjoint* almost his whole Body; so that he impos'd upon our Famous *Mullens*, who look'd on him in so miserable a Condition, that he would not undertake his Cure. Tho' he was a well-grown Fellow, yet he would appear in all the *Deformities* that can be imagin'd, as *Hunch-Back'd*, *Port-Belly'd*, *Sharp-Breasted*; he *Disjointed* his Arms, Shoulders, Legs, and

A remarkable
Instance of an
absolute Com-
mand of the
Joints and Mus-
cles; by -----
n. 242. p. 262.

Thighs, that he well appear'd as great an Object of Pity as any; and he has often impos'd on the same Company where he had been just before, to give him Money as a *Cripple*; he looking so much unlike himself, that they could not know him. I have seen him make his *Hips* stand out a considerable way from his *Loins*, and so high that they seem'd to invade the Place of his *Back*, in which *Posture* he has an extraordinary large Belly. He turns his *Face* into all *Shapes*, so that by himself he acts all the *Uncouth*, *Demure*, *Odd Faces* of a *Quaker's Meeting*. He began young to bring his Body to it; and there are several Instances of Persons that can move several of their *Bones* out of their *Joints*, using themselves to it from *Children*.

The Great Tendon above the Heel, after an entire Division of it, stitch'd and cur'd; by Mr. Will. Cowper. n. 252. p. 153. Fig. 78.

V. Feb. 1. 169^s, I was call'd to *Tho. Wheatly*, a Carpenter, aged 30 Years, who had totally divided the great *Tendon* of the *Musculi Gastrocnemii* of the Left Leg, about 3 Fingers breadth above the *Os Calcis*. I found the upper Part of the *Tendon* withdrawn from the inferior at least 2 Inches. I was oblig'd to divide the external Teguments *a b*, to come at the Ends of the *Divided Tendon A, B*; this done, the first Needle *C*, (with strong Silk in it well wax'd) I pass'd through the Body of the *Tendon A*, about half an Inch above its *Divided Extremity*; the 2d Needle and Silk *D* was thrust through this upper Part of the *Tendon*, a little under the former, lest the two Threads (or Silks) should meet each other at their *Decussation* in the middle of the *Tendon*. Afterwards both these Needles were pass'd through the lower Part of the *Divided Tendon B*. The Foot being held extended, the two Ends of the *Tendon* were apply'd to each other, by the Assistance of the Ligatures *C, D*, which were so ty'd, as to keep the *Divided Parts* close together; whilst the Foot remain'd in this *Posture*. After the 4 Ends of these Ligatures were cut off, I found it was necessary to bring the Sides of the divided Skin nearer each other with one single Stitch, a little above the Suture of the *Tendon*. This done, a Pledget of Lint dipp'd in *Balsam of Turpentine* was laid on the Wounds, and another large Pledget of Flax, arm'd with *Linimentum à Gummi Elemi* over it. After the Application of common Bandages, Bolsters, &c. I found it was necessary to place a thick Piece of Pastboard, of a convenient arch'd Figure, on the Fore-parts of the Foot and Leg, to keep the Part inflected, and to prevent any Motion of it, which might break out the *Stitches* in the *Tendon*. He complain'd very much in passing the Needles through the Upper-part of the *Divided Tendon*; tho' its middle and internal Part at the Division was scarce sensible of the Touch of my Finger: But he had no Pain in passing the Needles through the lower Part of the *Tendon*. After 14 Ounces of Blood was taken from his Arm, I left him on his Bed. Six Hours after, (which was about 8 at Night) I found his Pulse somewhat quicker than before: He then took an Ounce of *Syrup de Miconio*. The next Morning I found him in no ill Condition. He told me that he had got some Sleep that Night, but was often awaken'd with Twitchings in the Calf of the wounded Leg. The 3d Day after the Operation, I dress'd the Wound with the same Applications as before; only using a Fomentation, made of a Decoction of *Wormwood, Sage, Rosemary, Bay-Leaves, &c.* On the 4th Day

Day after the Operation, I found the Applications on the Wound very wet with a Serous Humour, commonly called a *Gleet*. On the 6th Day, the Matter became somewhat thicker; and the Skin being a little distended about the Wound, I was oblig'd to divide the last mention'd Stitch, to admitt of the free Discharge of the Pus, which on the two succeeding Days became much thicker than before, and the *Gleet* consequently lessen'd.

About this time, the two Ends of the *Tendon* were not a little dilated, and a white Slough appear'd on it toward the upper Part of the Wound; on which, instead of the *Balsam of Turpentine*, I apply'd *Tincture of Myrrh*. Not many Days after, this Slough came off, and the two Ends of the *Tendon* were overspread with a *Fungous* Flesh, by which I was assur'd, that its Blood-Vessels and Nutritive Tubes were not compress'd by the two first Ligatures. Afterwards I made use of drier Applications than before; sometimes using Lint only, and at other times *Pulvis Terebinthina*. About 10 Days after the Operation, I found one of the two Ligatures in the *Tendon* hanging loose, which I divided and drew out. Two or 3 Days after, I found the other Ligature loose also, which in like manner I remov'd; the Part all this while being kept infected by the Pastboard above-mention'd.

I was often oblig'd to apply gentle *Escharoticks*, to lessen the *Fungus* on the *Tendon*. In less than 30 Days after the Operation, he went abroad very lamely. And not many Days after, he told me he had walked round *S. James's Park*. On the 26th of *March* following, (which was within 8 Weeks after the Operation) he walked from his Habitation in *Witchstreet* without *Temple-Bar* to *Greenwich*, and return'd in a few Hours. He has since recover'd all the *Motions* of his *Foot*, and shews very little Lameness in Walking, and is not in the least incommoded at his Trade.

It is a common Opinion, that *Stitching* divid'd *Tendons* is hazardous, if not impracticable; and tho' the Authority of some *Writers* would have prevail'd with me, in some measure, to have an Opinion of the Success of such an Attempt, yet the Contradictions of others, of no less Note, would have left me dubious, had I not some time since seen large *Blood-Vessels* in the *Tendon* of a Horse's Leg, which at that time convinc'd me, that *Tendons* as well as *Bones*, and other Parts, would *Unite*, tho' they were quite Divided, in case the Neighbouring Parts remain entire, if their two Extremes could be Artificially apply'd to each other, without compressing all or the greatest part of their *Blood-Vessels*. This Distribution of the *Blood-Vessels* is express'd in the annex'd Figure, where one Trunk A, A, with its Branches a, a, to the *Fibrilla* of the *Tendon* B, B, is express'd. Whether it was a *Vein* or an *Artery*, I could not discover in that Subject; but in all Probability, both those Vessels have the like Disposition in such large *Tendons*. I am inclin'd to think the like Distribution of *Blood-Vessels* is not to be found in the *Tendon* which was divided in this present Instance; but that its *Blood-Vessels* pass into it and back again at its internal side, next the *Muscles* of the *Toes* and *Tarsus*; which ought to be taken Notice of by the Operator in the like Case, and that he do not free it of its *Fat* and *Membranes* next those *Muscles*, lest its Communication with the *Blood-Vessels* be destroy'd.

Fig. 79.

VI. Accounts and Emendations of Books omitted.

- n. 194. p. 544. 1. **O**steologia Nova, or some Observations of the Bones, &c. by Clopton Havers, M. D. Lond. 1691. in 8vo.
- Ph. Col. n. 2. p. 22. 2. De Ratione Motus Muscularum; by Dr. C. An. 1664. The Author here farther explains his Hypothesis, and obviates some Objections to it.
- n. 10. p. 176. 3. Nic. Stenonis de Musculis & Glandulis Observationum Specimen; cum duabus Epistolis Anatomicis.
- n. 27. p. 512. 4. Elementorum Myologiae Specimen; seu Musculi Descriptio Geometrica. Auth. Nicolao Stenone. Florentia, 1667. in 4to.
- n. 32. p. 627. 5. Myotomia Reformata, or a new Administration of all the Muscles of Humane Bodies; wherein the true Uses of the Muscles are explained; the Error of former Anatomists concerning them confuted; and several Muscles not hitherto taken notice of described. To which are subjoined, a Graphical Description of the Bones and other Anatomical Observations; illustrated with Figures after the Life. By Will. Cowper, Surgeon. Lond. 1694. in 8vo.
- n. 251. p. 130. 6. An Account of 5 Pair of Muscles, which serve for different Motions of the Head, on the first and second Vertebra of the Neck; and of two Ligaments, one of which fastens the Head to the first Vertebra, the other fastens the first to the second. To which is annex'd the History of an uncommon Appearance of a Humane Skull. By M. Dupre. But Mr. Will. Cowper here shews, that the Discovery of these Muscles is not New; most, if not all, of them being either described by him in his Myotomia Reformata and other Anatomists, or only the different Appearances of known Muscles in particular Subjects: To which he adds two exact Figures of the same Bones and Muscles, done after the Life.
- n. 41. p. 883. 7. Tractatus 5 Physico-Medici; de Sale-Nitro & Spiritu Nitro Aereo, &c. de Motu Musculari, & Spiritibus Animalibus; de Rachitide. Auth. Joh. Mayow, L. L. D. Oxon. 1674. in 8vo.
- n. 105. p. 101. 8. Wilhelmi ten Ryne, M. D. &c. Transfilano-Daventriensis; 1. Dissertatio de Arthritide. 2. Mantissa Schematica. 3. De Acupunctura. 4. Orationes tres sc. de Chymica & Botanica Antiquate & Dignitate; de Physiognomia; de Monstris. Lond. 1683. in 8vo.
- n. 148. p. 222. 9. Two Treatises; the one, Medical of the Gout; by Herman Buschhof Senior, of Utrecht. The other partly Chirurgical, partly Medical, containing some Observations and Practices relating to some extraordinary Cases of Diseases in both Sexes; by Hen. van Roonhuyse. English'd out of Dutch. Lond. 1676. in 8vo.
- n. 125. p. 621.

CHAP. VII.

Monsters.

I. IN the House of M. Bourdelot was shew'd a *Monster* in Form of an *Ape*, A Monstrous Birth like a Monkey at Paris; by M----- n. 26. p. 479. having all over its Shoulders, almost to his Middle, a *Mass of Flesh* that came from the hinder Part of its Head, and hung down in Form of a little *Cloak*. The Report is, that the Woman which brought it forth, had seen on the Stage an *Ape* so cloathed: The most remarkable thing was, that the said *Mass of Flesh* was divided in four Parts, correspondent to the Coat the *Ape* did carry. The Woman, upon Enquiry, was found to have gone five Months with Child, before she had met with the Accident of that unhappy Sight.

II. I have lately lighted upon a *Monstrous Birth*, viz. *Twin-Females*, very handsome, but so fastned together by the *Breast*, that there was not discern'd but one only Trunk of the Body; which having their Chin united together, seem'd to kiss one another. I opened them at the *Navel*, which was common to them both, and found that there was but *One Heart*, though greater and rounder than ordinary; so that Nature seem'd to have united the Matter of two into one. They had *Two Lungs*, and *One Stomach*, the *Pylorus* of which did strangely branch itself into Two Ranks in the Bowels. There was but *One Liver*, but big; for the rest, there were *Two Spleens*, *Four Kidneys*, *Two Wombs* full of a white Matter, like a concreted Semen, and *Two Vulva's*, with their distinct *Hymens*. Twins fastned together at the Breast; by S. Jac. Grandi. n. 98. p. 1188.

III. Octob. 22, 1679, One *Grace Batterd*, of *Plymouth*, of honest Repute, and Mother of 5 Children, about 12 o' Clock at Night began to have *Travailing Pains*; and near 4 o' Clock in the Morning the Head of a Child came to the Birth; when the Midwife, putting her Hand to help off this, felt another, by its Heat and Motion alive. This Birth had *Two Heads*, and *Two Necks*, as also the *Eyes*, *Mouths*, and *Ears*, suitably *Double*; *Four Arms*, with *Hands*, and as many *Legs* and *Feet*. There was to both but *One Trunk*; but *Two Back-bones*, from the *Clavicles* to the *Hypogastrium*; and from the Shoulders down to the Bottom of the Loins they were not distinct, but cemented and *concorporated* after this Manner; the Right *Clavicle* or Channel-Bone of the Right-hand Child (being long) join'd with the Left *Clavicle* of the Left-hand Child. The *Ribs* on the Face-side of both of them, by the *Cartilages* or *Gristles*, were *United* without any intervening *Sternum* or *Breast-bone*; and so made a common *Chest* to them both: And the *Ribs* of both on the Back-part were *United* by the *Gristles*; and from the *Clavicle* down to the *Hypogastrium*, or Bottom of the Belly there, were so *conjoin'd*, that they made but *One common Belly*, with one *Navel-String* to them both; but from the *Hypogastrium* downwards they were *divided*, Twins fastned together at the Breast; by Dr. Will. Dugston. n. 65. p. 2096.

vided, and became *Two*, each having the perfect Parts of *Females*; they were exactly like one another, very well Featured, having also pretty neat and handsome Limbs. They had their Hair more than ordinary thick, and about half an Inch long, and the Nails full grown. The Weight of this Birth was $8\frac{1}{2}$ Pounds; the Circumference of the Left Head was about 11 Inches, that of the Right being half an Inch less. The Circumference of the Trunk was about 16 Inches and $\frac{1}{2}$; and the Length of both, from Head to Foot, was full 18 Inches and a half.

We found on Dissection *One Navel Vein*, and *One Liver*, but that was very large, with the *Bladder of Gall* seated in its usual place; but there were *Two Urinary Bladders*, *Two Wombs*, *Four Kidneys*, and *One Stomach*, with the *Oesophagus* or Gullet perforate and open from the Mouth of the Left Head; but the *Oesophagus* from the Mouth of the Right Head descended no lower than a little above half an Inch of the *Mid-riff*, and there it ended. Whence it may be concluded, that the Right-hand Child must have received its Nourishment by and from the Left Child. There was but *One Colon*, which terminated into two *Intestina Recta*. So there was but *One Mid-riff*; and above that, we could find little or no Appearance of *Lungs*; but only a very large *Heart*, (with two *Auricles*) the Figure of which was not Conical, but like a Soldier's *Pera* or Snapfack, or the *Ventricle* or *Stomach*, and lying near under the *Clavicles* transverse, as the *Stomach* lieth under the *Mid-riff* and *Liver*. We did also observe *Two Ventricles*, with the *Tricuspid* or *Sigmoid-Valves*; as also the *Vena Cava* and *Aorta* dependant, and also the *Aorta* ascending and bifurcate towards each Neck, and then bifurcate again.

The Mother is in as good a Condition of Health, as Women in Child-bed use to be.

A Twin-Female
Infant United
below the Dia-
phragm; by Dr.
S. Morris. n.
138. p. 561.

IV. At *Petworth*, in *Suffex*, Dec. 20, 1677, one *Joan Peto*, a Butcher's Wife, after most acute Pains, was, by her Midwife, delivered of a *Monstrous Female-Birth*. It had *Two Heads*. Both the Faces very well shaped. The Left Face looked Swarthy; and never breathed. And the Left Head was the bigger, and stayed longer in the Bearing. The Right Head was perceived to *Breathe*, but not heard to *Cry*. Betwixt the Heads was a *Protuberance*, like another *Shoulder*. The *Breast* (and *Clavicles*) very large, about 7 Inches broad. But *Two Hands*: And but *Two Feet*.

The *Brain*, in each Head, was very large. The *Spina Dorsi*, from the Neck to the Loins, was double. There were also *Two Hearts*, one on each side the *Thorax*; the Left Heart the bigger. And *Two Pair of Lungs*, one infolding each Heart. Those in the Left-side were blackish; the other looked well. The *Mediastinum* parted the *Two Hearts* one from the other. The *Aorta* and *Vena Cava*, below the *Diaphragm*, single: The *Diaphragm* having only three Perforations, as is usual. But a little above it they were each divided into *Two Branches*, distributed to the *Two Hearts* in the Figure of a Greek Y. The *Oesophagus*, in like manner, a little above the *Diaphragm*, scil. about the *Fifth Vertebra*, was divided into *Two Branches*, one ascending up into each Throat. There were also *Two Stomachs* or *Ventriculi*;

tricoli; One shaped as in a Natural Birth: The other, a kind of great Bag, bigger than the Natural Ventricle. In which respect, it answered to the Paunch in a Cow or Sheep; but, in regard of its Place, rather to the *Reticulus*, or else to the *Abomasum*; being at the one Orifice continuous with the true *Pylorus*, and at the other with the *Duodenum*. Within it was contain'd a Substance like *Meconium*, as is usual in Children newly born. The *Liver* but *One*; but very great: And the *Cystis Fellea* proportionable. The *Spleen* also *One*, but large. So were the *Intestines*; and all the Parts of the *lower Ventricle*, especially the Left *Kidney*. The *Uterus* of an unusual Bigness; but the *Clitoris* large.

The *Secundine* extraordinary great, weighing about eight *Pounds*.

V. I have seen a *strange Birth* at *Hilbrewers* in *Somersetshire*. There are 2 things which seem to me probable: 1. That Nature designed and made Preparation for *Twins*. For, the *Joining* of these Two Infant Bodies beginning at the Navel, each hath all its Parts below to the very Toes proper to itself, and not only *Distinct* all along, but *Separate*. Upwards, beneath the *Breasts*, these Bodies part again, and then all is, as below, *Distinct* and *Separate*. When laid *Supine*, they seem to have but *one Body* where joined; but when *turned*, there is a deep Furrow between both, each hath a *Distinct Spina Dorsæ*, &c. each hath *Nipples* in their proper Place, respecting the several Bodies; but one of each is seen before, the other behind, respecting the whole; they do not *Wake* and *Sleep* together certainly; they *Suck* and *Cry* heartily, *Exonerate* apart freely, and are likely to *live*, if the Multitudes that come to see them (sometimes 500 in a Day) do not occasion the shortening of their Lives. They are *Christened* by the Names of *Aquila* and *Priscilla*, though both *Females*; they were born by an easy Travail to the Mother (who had been 2 Years infirm) on the 19th of *May*, 1681. She had had 5 Children before. 2. The other thing I observe as credible is, that this Accident might happen in some such way as this: Near the Time of the first Formation of the *Fœtus*, the *Navel-Strings* of each chanced to be so *joined*, that all along, from within the Bodies of the Children to the end terminating in the *Womb*, they might seem as *One*. The *Midwife* said, the *After-burthen*, though but *One*, was tripple in Bigness to what is usual; that the *Navel-String* was very great; so that 'tis easy to conceive, there might be *Distinct*, though *Joined Umbilical Vessels*, which, in likelihood, parted within that common *Navel*, whence each Body had a just Distribution of its proper Vessels. There was such a Crowd of People there, that I could not give myself that Satisfaction I desired; yet I thought it worth my Pains to see and understand thus much of this unusual Accident. One in an adjoining Parish told us, that an ancient Man living there remembered his Wife (now dead) had, about 40 Years since, seen such a thing in *Wales*, and that the Children lived so long as to be able to talk to one another, and that into Tears, when the one thought what the other should do when either should happen to die; and that both died together.

*A Double Birth
join'd at the
Breast, in So-
merfetshire, by
Mr. A. P. Pb.
Col. a. a. p. 21.*

VI. There

Two Monstrous
Births in Scot-
land; by Dr.
Geo. Garden. n.
175. p. 1156.

VI. There have been two *Monstrous Births* this Year at *Aberdeen*, both *Females*: The first was two perfectly form'd Children above and below the Belly, having *Two Heads*, *Four Arms*, and *Four Legs*; only the two Arms, which stood next the other, were not perfectly form'd into *Hands* and *Fingers*, the *Breasts* beginning to join thereabouts; there was but *One Belly*, tho' somewhat bigger than ordinary; *One Navel* and *Navel-string*, ty'd to *One After-Birth*; yet there were *Four Buttocks*, *Two* distinct *Fundaments*, and the *Two Privities* were confounded together. 'Tis thought they might have been brought forth alive, but that they staid so long in the Birth; for that both Heads presenting together, the Midwife thought they had been *Twins*, and thrust one of them always back.

The other had all the due Proportions of one Child, the *Head* excepted; it having *Two Heads*, the one standing behind the other; the foremost less than the due Proportion, and bowed down upon the Breast, having *Yellow Hair*, and wanting nothing of the due Proportion of the Face, save one Cheek beneath the Eye; the other bigger than ordinary, standing somewhat higher, having no Face, which they suppos'd to have been disfigur'd by the Back-part of the foremost.

A Monstrous
Boy; by S. Jac.
Grandi. n. 58.
p. 1189.

VII. I have lighted upon a *Monstrous Boy*, terrible to behold, born with his *Breast* open, the *Bowels* out of the Belly, the *Legs* distorted, the *Bladder* in the Place of the *Fundament*; in the *Genitals*, besides that the *Testiculi* were close to the *Kidneys*, there was nothing but a *Membranous Expansion*, wherein the *Spermatick Vessels* were lost.

A Monstrous
Child; by M.
Chr. Krahe. n.
160. p. 199.

Fig. 80.

VIII. Feb. 29. 1684. at a Village call'd *Heisagger*, near *Hatterfleben* in *South Jutland*, a Soldier's Wife was deliver'd of this *Monstrous Child*: It is suppos'd she had seen some body Wounded or Disfigured in the same manner, as it doth appear at the Child's Leg or Foot. At the Left Leg, 1. There was to be seen an oblong round Piece of Flesh, of a Brown and Blue Colour, at the Extremities somewhat sharpen'd, which was join'd to the Calf of the Leg 2, and could be mov'd or put out and in from 1 to 3; that other Piece of Flesh 4, was of the same Colour, but fastned to the Leg, so that it could not be displaced. At the Right Foot it hath 6 Toes; 7, was like a Bullet of a Pistol, which did hang loosely to the Leg; 8, another Bullet somewhat bigger. The Face did look pretty old, as it had been of 35 or 40 Years of Age. 5, and 6, At the Forehead there had been observ'd such *Excrescencies* as if it were *Artificial Laces*: Which the Painter, who 3 Days after it was dead did draw the Scheme, testifieth to have been almost spoil'd or rotten by the touching of so many 100 of People that went to see this Creature. But before, when the Head of the Child was turn'd against the Light of the Sun, these *Physical Laces* seem'd to be very Artificially done. With the *Left Eye* it did look fiercely, keeping the other close. Behind the *Head*, there was a Shape like a *Hood*, or other Ornament, which Women commonly do wear. His *Arm* was figur'd like as the Scheme sheweth,

eth, with several Knots or Joints. The *Tail*, which was strangely grown out of the Back-part 9, was a Quarter of a *Zealandish Ell* long. The Mother of this Child, being aged about 40 Years, hath had formerly 2 other Sons, now of 7 and 9 Years of Age, which are well shap'd, and still alive: But this *Monster*, after it had cried out two or three times, died presently.

IX. *Hermaphrodito*, quem discriptum eo, nomen est *Anna Wilde*; natus vero est (condonandus enim *Hermaphrodito Solæcismus*) Mense *Februario*, ipso *Purificationis Festo*, Anno Salutis 1647, in Pago non ignobili Agri *Hamptoniensis*, vulgò *Ringwood*. Sexto *Ætatis* Anno inter saltandum Coluclandumque cum pueris coxtaneis (quos omnes Viribus facillè superabat) Extuberationes duæ, *Herniarum* instar *Βεζωνοκηλῶν* dictarum, primum emicquere; quibus in ordinem redigendis (id enim illis animi erat) Chirurghi diu Operam luserum; *Testiculi* enim erant, qui jam prægrandæ facti, *Scrotis* cutaneis, corrugatis, pilisque obsitis inclusi, non alio discrimine à Virilibus naturaliter se habentibus distinguuntur, quàm quòd singuli *Testes* suo proprio divisoque ab invicem hìc *Scroto* gaudeant, ita tamen elongato, ut ex vitiusque Productione constringantur *Labia Vulvæ*. In Sinu Muliebri *Nympha* & *Caruncula Myrtiformes*, integræ satis se produnt: Quin & Membranula quadam, à *Perinao* sursum tendente, media pars *Vulvæ* tegitur. *Clitoris* non apparet, *Uterus* ejusque *Cervix* à Communi sequioris Sextus Lege ne minimum quidem recedunt. Usque ad tertium supra decimum ætatis annum pro *Fæmella* habitus, & *Fæmineo* Vestitu indutus, munera illi Sexui destinata inter *Fæminas* assidue obibat. Cum forte vero Pani subigendo strenuam navaret Operam, en derepente *Priapus*, ad id temporis latens, magno cum Impetu foras prorupit, accedente non levi ipsius *Μεταμορφωμένης* stupore. Erectus *Penis* quatuor circiter pollices æquat. Locum Virgæ Virilis ipsissimum occupat; in *Glandem* pariter desinit, *Præputio*, quod illi etiam Frænulo, ut in *Viris* fit, annectitur, instructam: Sed *Glans* imperforata (ita tamen ut tenuis Membranula eam obturans facillè pertundi posse videatur) *Semine* per *Urethram*, ceu potius Virgæ canaliculum viam affectanti, exitum negat; unde per Pudendum Muliebrem refluxum forte) excernitur.

Cum Annorum esset 17, *Menstrua* periodice & modo debito fluere cœperunt atque per Biennium perseverarunt. Quo elapso, iisdem non amplius comparentibus pullulavit *Barba*, & exinde totum corpus *Pilosum* conspiciuntur; Vox Corporisque habitus *Virilem* æmulantur. Crinis se habet *Virorum* ad instar: *Mammæ* nullæ exsurgunt; *Papillæ* perquam exiguæ. *Pectus* Latum est. *Ischia* non ita dissita. *Nates* quàm sunt *Fæminarum* contractiores.

Se ad utrumque Sexum comparatum asserit, sed *Fæminis* misceri præoptare; quas etiam cum videt, & concupiscit, erigitur *Penis*, qui quoties *Virum* appetit, Flaccidus manet. Unum hoc, idque nec extra *Oleas* putem, *Coronidis* loco subnectam; quod nempe, cum nocte quadam, quam totam *Triputiis*, *Compotationibus*, cæterisque id genus *Lasciviz* incitamentis, cum aliquot ejusdem *Farinz Congerronibus* insumpserat, *Oculos* in *Virum* quendam

Formæ Venuſtioris conjecerat, mox eum adeo deperibat ut ſequenti die, præ Amoris æſtro, in *Paſſionem Hyſtericam* incideret, quam revera talem fuſſe, non ſolum *Elevatio Abdominis, Cantus, Riſus, Fletus*, notiſſima illius Intemperiei Symptomata) ſed & Juvantia, ſatis liquido comprobarunt: Applicato quippe *Emplaſtro ex Galbano* Regioni Umbilici, exhibitifque Remediis *Hyſtericis* illico convaluit.

An Hermaphrodite at Tholouſe; by M. Veay. n. 186. p. 282.

X. Nov. 1686. On apporta à l'*Hôpital S. Jacques*, une Servante malade *Hermaphrodite*. Elle à été Baptiſée en qualité de *Fille*, ſous le Nom de *Marguerite*. Son Pere eſt un pauvre homme de *Pourdiac*, à 7 lieues de *Tholouſe*, qu'on appelle *Malaufe*. Elle eſt âgée 21 à 22 *Ans*, ayant bien la Mine Extérieure d'une *Fille*, mais les marques céelles d'une *Homme* bien puiſſant. Son Viſage eſt *Feminin* & aſſez agreable, la Gorge bien jolie, & les *Mammelles* aſſiſ bien faites qu'on les puiſſe deſirer à une *Fille*, les *Feſſes* & les *Cuiſſes* grandes comme aux *Femmes*, les *Parties Honteuſes* tout comme celles d'une *Femme*; mais elle n'eſt percée que de la profondeur de deux petits travers de doigts; & au milieu de cette fente, il pend un *Membre Viril* d'une groſſeur fort conſiderable, & qui dans l'*Erection* luy fort au dehors d'environ 8 *pouces*. Ce *Membre* eſt bien formé, hormis qu'il n'a point de *Prepuce*, & qu'il n'eſt pas accompagné de *Teſticules* apparens. L'*Urine* & la *Semence* en ſortent comme aux *Hommes*; & ce qu'il y a de particulier, c'eſt que le *Sang Menſtrual* coule aſſiſ par ce même conduit de la *Verge*.

J'aurois eu de la peine à le croire, ſi je ne l'avois veu moy-même, & examiné fort exactement dans le temps que ces *Menſtrues* couloient, les quelles luy ſurviennent preſque tous les Mois aſſez regulierement, ne paſſant gueres deux Mois de temps ſans les avoir; mais preſque toujours avec de grandes Douleurs & une Tenſion au bas Ventre, qui marque une eſpece de *Inflammation* dans ces *Parties*.

J'ay fait voir cela à pleuſiers de nos Medecins, & apres avoir conſulté Meſſieurs les *Vicaires Generaux*, nous luy avons fait prendre un habit d'*Homme* ſous le Nom d'*Arnaud Malaufe*; & on va preſentement luy faire apprendre quelque Metier. Il n'y avoit pas à heſiter la deſſus, parce que notre *Hermaphrodite* peut fort bien faire la fonction d'*Homme*, & point du tout celle de *Femme*.

CHAP. VIII.

The Period of Human Life.

An Anatomical Account of Tho. Parre; by Dr. Harvey. n. 44. p. 286.

I. **T**HO. Parre was a poor Countryman of *Shropſhire*, whence he was brought up to *London* by *Thomas Earl of Arundel and Surrey*, and died at the Age of 152 Years and 9 Months. Being open'd after his Death, (Nov. 16. 1635.) his Body was found yet very Fleſhy, his Breſt Hairy, his

his Genitals unimpaired, serving not a little to confirm the Report of his having undergone publick Censures for his *Incontinency*, especially seeing that after that time, viz. at the Age of 120 Years, he married a Widow, who own'd *Eum cum ipsa rem habuisse, ut alii Mariti solent, & usque ad 12 Annos retro-actos solitum cum ea Congressum frequentasse.* Farther, he had a large Breast, Lungs not fungous, but sticking to his Ribs, and distended with much Blood; a Lividness in his Face; as he had a *Difficulty* of Breathing a little before his Death, and a long-lasting *Warmth* in his Armpits and Breast after it, (which Sign, together with others, were so evident in his Body, as they use to be in those that die by *Suffocation.*) His *Heart* was great, thick, fibrous, and fat. The *Blood* in the *Heart* blackish and dilute. The Cartilages of the *Sternum* not more *Bony* than in others, but *flexile* and soft. His *Viscera* very sound and strong, especially the *Stomach*; and it was observed of him, that he used to eat often by Night and Day, though contented with old Cheese, Milk, coarse Bread, small Beer, and Whey; and which is more remarkable, that he did eat at Midnight a little before he died. His *Kidneys* were cover'd with *Fat*, and pretty sound; only in the anterior Surface of them, there were found some aqueous or serous (as 'twere) *Abscesses*, whereof one was near the Bigness of a Hen's Egg, with a Yellowish Water in it, having made a roundish Cavity, impressed in that *Kidney*: Whence some thought it came, that a little before his Death a *Suppression* of *Urine* had befallen him; though others were of Opinion, that his *Urine* was *suppressed* upon the Regurgitation of all the Serosity into the *Lungs*. Not the least Appearance there was of any *stony* Matter, either in the *Kidneys* or *Bladder*. His *Bowels* were also sound, a little Whitish without. His *Spleen* very little, hardly equalling the Bigness of one *Kidney*. His *Brain* was entire and firm: And though he had not the Use of his *Eyes*, nor much of his *Memory*, several Years before he died; yet he had his *Hearing* and *Apprehension* very well, and was able even to the 130th Year of his Age to do any Husbandman's Work, even Threshing of Corn.

In short, all his inward Parts appear'd so healthy, that if he had not chang'd his Diet and Air, he might perhaps have lived a good while longer. But coming out of a clear, thin, and free Air, into the thick Air of *London*, and after a constant, plain, and homely Country Diet, being taken into a Splendid Family, where he fed High, and drank plentifully of the best Wines; whereupon the natural Functions of the Parts of his Body were overcharged, his *Lungs* obstructed, and the Habit of the whole Body quite disorder'd; upon which, there could not but soon ensue a *Dissolution*.

II. 1. When I came first to live at *Bolton*, I was told several Particulars of the great Age of *Henry Jenkins*; but I believed little of the Story for many Years, till one Day coming to beg an Alms, I desired him to tell me truly how old he was. He paus'd a little, and then said, that to the best of his Remembrance he was about 162 or 3; and I ask'd, What Kings he remembred? He said *Henry VIII.* I asked, What *Publick Thing* he could longest remember? He said, *Plowden Field*; I asked, Whether the King was there?

The great Age of Henry Jenkins; by Mrs. Anne Savile. n. 221. p. 266.

He said, No, he was in *France*, and the Earl of *Surrey* was *General*. I ask'd him, How old he might be then? He said, I believe I might be between 10 and 12; for, says he, I was sent to *Northallerton* with a Horse-Load of Arrows; but they sent a bigger Boy from thence to the Army with them. All this agreed with the History of that Time; for Bows and Arrows were then used; the *Earl* he named was *General*, and King *Henry VIII.* was then at *Tournay*. And yet it is observable, that this *Jenkins* could neither Write nor Read. There were also 4 or 5 in the same Parish that were reputed all of them to be 100 Years old, or within 2 or 3 Years of it, and they all said he was an elderly Man ever since they knew him; for he was born in another Parish, and before any Registers were in Churches, as it is said. He told me then too, that he was Butler to the Lord *Conyers*, and remembered the Abbot of *Fountain's-Abbey* very well, before the *Dissolution* of the *Mona-steries*.

By Dr. Tancred
Robinson. 1b. p.
267.

2. *Henry Jenkins* departed this Life Dec. 8. 1670. at *Ellerton* upon *Swale* in *Yorkshire*: The Battle of *Plowden-field* was fought Sept. 9. 1513, and he was about 12 Years old when *Plowden-field* was fought. So that this *Henry Jenkins* lived 169 Years, viz. 16 longer than old *Parre*, and was the oldest Man born upon the Ruins of this *Postdiluvian* World.

In the last Century of his Life, he was a *Fisherman*, and used to wade in the Streams; his Diet was coarse and sour; but towards the latter End of his Days, he begged up and down; he hath sworn in *Chancery* and other Courts to above 140 Years Memory, and was often at the *Affizes* at *Tork*, whither he generally went on Foot: And I have heard some of the Country Gentlemen affirm, that he frequently swam in the Rivers after he was past the Age of 100 Years.

By Mr. Hill.
n. 228. p. 543.

3. In the *King's Remembrancer's Office* in the *Exchequer*, is a Record of a Deposition in a Cause by *English Bill*, between *Ant. Clark* and *Smirkson*, taken April 1665, at *Kettering* in *Yorkshire*, where *Henry Jenkins* of *Ellerton* upon *Swale*, Labourer, aged 157 Years, was produced, and deposed as a Witness. Divers very ancient Witnesses swore him to be a very old Man when they first knew him.

Several very
Aged Persons in
the North of
England; by Dr.
Mart. Lister. n.
160. p. 597.

III. 1. *Rob. Montgomery*, now (in the Year 1670.) living at *Skipton* in *Craven*, but born in *Scotland*, tells me that he is 126 Years of Age. The oldest in *Skipton* say, that they never knew him other than an old Man; he is exceedingly decay'd of late, but yet he goes about a begging.

2. *Mary Allison*, of *Thorlby* in the Parish of *Skipton*, died 1668, aged about 108. She spun a Webb of Linnen-Cloth a Year or two before she died.

3. *J. Sagar*, of *Burnly* in *Lancashire*, about 10 Miles off *Skipton*, died about the Year 1668, and was of the Age (as is reported) of 112.

4. *Tho. Wiggin*, of *Carlton* in *Craven*, died in 1670, at the Age of 108, and odd Months: He went about till within few Weeks of his last, and was a very fair Corpse.

5, 6. *Frances Woodworth*, of *Carlton*, died in 1662, of the Age of 102, and some

some odd Months; the Mother of 7 Children, always a very lean Woman, yet to her very last went about as straight and upright as a young Girl, and of perfect Memory; her Sight and Hearing decay'd, though not wholly deprived of either. This by Information from her Son Robert Woodworth, now (in 1670) living in Carlton, of the Age of 69, as able a Man to Ditch and Plough as any in the Town.

7, 8. Wil. Garthorp and Will. Baxter, of Carlton, inform me, that they two being upon the Jury at York in 1664, they saw and spake with, in the Assize-Hall, two Men, Father and Son, summoned as Witnesses in some Cause of other out of Dent, a small Village in Craven, 8 Miles beyond Settle: The Father told them, that he and his Son made 12 Score between them, and that his Son was above 100, and that he wanted not half a Year of 140. He told them farther, that he could and did make Fish-Hooks as small as would take a Trout with a single Hair. They observed, that the Son looked much older, and had the whiter Hair. NB. It is to be observed, that the Food of all this Mountainous Country is exceeding coarse, as salted and dryed Beef, and sour Leavened Oat-Bread. I am confident, many Scores of Persons might be found of the Age of 100 Years among these Northern Mountains.

IV. 1. My Lord Bacon says, that the Countess of Desmond, in Ireland, was 140 Years of Age.

2. Mrs. Eckleston, who lived at Philipstown in the King's County, was born in the Year 1548, and died 1691; so she was 143 Years old.

The great Age of two Persons in Ireland; by Dr. Tho. Molineux. n. 261. p. 502.

V. After I had often reflected upon the general Causes of Diseases that lead to Death, I mean those of the Debilitation of Nature's Strength in the Course of Man's Life, until its utter Extinction, and of the Causes of a merely Natural Death, by the Failure of that Strength in an extreme Decrepit Age, without the Concurrence of any Excess or External Cause; I have entertained some Conjecture, that if we were more intelligent in this Matter than we are, we might procure for ourselves an Age of continual Youth; setting aside the several Accidents of Divine Providence, and merely considering the Forces of Nature, not only not hinder'd, but also assisted as much as may be.

Searching therefore for the true Causes of Old Age, and of Natural Death, I was not satisfy'd with that Extinction of Natural Heat and Desiccation of the Radical Humour, assigned to be the Cause thereof, nor with the Causes of this Extinction and Desiccation, that are commonly alledged, it being suppos'd, that this hot and moist Principle of Life, in its own Nature dissipable in the Course of Life, not being perfectly repaired by Food, is considerably diminished, which brings Old Age, and is at last consumed, which causeth Natural Death; where Authors make a great Difference between the Seminal Heat and the Moisture, and that which comes from Aliments; so that, say they, the former cannot be repaired by the latter, as being Heterogeneous. Which to me seems not to be true: For doth not this Seminal Heat and Moisture originally

Longevity and the Causes of Natural Death; by M. de Martel. n. 58. p. 1179.

originally proceed from what is superfluous of the third *Concoction* of the *Aliments*? It is therefore of the same Nature, and nothing hinders; but what is dissipated thereof, may be perfectly restored by good Nourishment, well prepared, and taken seasonably and in due Quantity. Whence it may be justly concluded, that the Defect of repairing this *Principle of Life* comes not from its Nature, not reparable this way, but from something else.

The Illustrious *Bacon* conceived, that this Fault came from the unequal Reparation of the liquid or soft, and the dry or more solid Parts, which jointly serve to maintain and repair themselves; whence it comes to pass, that the most easy to repair, and the most necessary for Life, as the *Blood*, cease at last to be sufficiently repaired by the Defect of the others, which are not repaired at all. *Sanctorious*, being almost of the same Sentiment, holds, that *Natural Death* happens, because the *Fibres* do so dry up, that they can no more be renewed; he making the Maintenance of Life to depend from the Renovation of the Parts. Which doth not satisfy me neither, because even the *Bones* themselves, which are the hardest Parts, are capable of Renovation in *Old Age*; in regard that *old Oxen*, which we often eat, have at certain times (I say not of the *Moon*, according to the common Opinion) their *Bones* of the same Place altogether dry and *marrowless*, and at other times bedewed with a Substance of the Nature of *Marrow*, wherewith they are then filled, which enlargeth their Pores as of a fine Sponge, and softens them; which then especially comes to pass, after they have fed upon good Pasture in the Spring.

We must therefore enquire into other more true Causes of *Old Age* and *Death*, which to me seem to be the following: I suppose, that the *Blood* is the *Principle of Life*, as far as 'tis *Vital*, that is, in Motion by the Hot Particles contained therein; so that those who expire by *Age*, do not die for being destitute of *Blood*, which is found abundant and laudable enough in their Vessels, and which hath been sufficiently repaired till then; but because it ceaseth to be *Vital*, by reason of the too easy Dissipation of the *Igneous* Particles, which make it such: Which, in my Opinion, comes to pass as it doth in Wine, which evaporates and looseth its Strength by the Fault of the Vessel, which by some Opening or other gives Passage to what gives Vertue to the Wine. The *Tunics* and *Membranes* of the *Veins* and *Arteries* which enclose the *Blood*, wear in time away and wax thin, and their Texture gives and breaks in several Places; at which Apertures, the *Igneous* Particles abandon the *Blood*: As in Stuffs and Cloth, (whose Wooll is in a manner like that of the *Tunics*) the Threads by wearing do loosen and break, insomuch that many Holes are made in it, as in a Sieve. So that if we had the Art to reinforce and to strengthen anew those *Coats* and *Membranes*, that they might not let slip what maketh the *Blood Vital*, the *Life* would be preserved perpetually. For a Proof of which, this may serve for the present, that the *Life* of many dying Persons is maintained for some time, by making them swallow some hot and spirituous Liquor, as *Spirit of Wine* or some *Essence*, by which the *Blood* is fortified and quickened for

for some Moments: But as this Reinforcement of *Life*, convey'd to the *Heart*, and running into the *Veins*, soon slips out, so also this new Vigour passeth away quickly.

As there is no reason to despair of finding out such Medicines, or Aliments, as are proper to strengthen the *Coats* and *Membranes* of the *Vessels*, so as that they may at all times retain the *Fiery* and *Spirituons* Corpuscles of the *Blood*, as well as in the time of *Youth*; we may also hope to be enabled to maintain the *Blood* in a Condition always to furnish alike, as in our vigorous Age, for all the Functions of *Life*: The Engine of our Body being not unlike to a *Chymist's Furnace*, which at first well retaining the *Heat*, is very proper for the Operations of Art; but at last Chinks and Crevices being made therein, it ceases to be so, the *Heat* getting away through them, what Fire soever you kindle therein.

VI. Having some Months since entertain'd a Suspicion, that the Causes of *Tides* at *Sea* do also continually exert their Power in other Places, though the Effects thereof may not be so sensibly perceiv'd on the solid as the fluid Parts of the Terraqueous Globe, I took this Method to examine it. *First*, I divided the *Nyx & Dies* into four *Senaries* of the Hours: The *First* consisted of 3 Hours before the *Southing* of the *Moon*, and 3 after; the *Second* of the 6 Hours following; and so the 3d and 4th containing the two remaining Quarters of the Natural Day. I next betook myself to observe *Births* and *Deaths* in our own Kind, as also of other Species of Animals, whether they fell out indifferently in any of these 4 *Senaries*: And I found none that were born or died a Natural Death in the 1st and 3d *Senaries*, which I take liberty to call *first* and *second Tides*, but every one either in the *second* or 4th *Senaries*, which I call *first* and *second Ebbs*. I then proceeded to make Observation in the *Motions of Diseases*, which I could the better do, because I had some in my Family visited with *Agues*. Here I found that the Tumult of the *Fitts* generally lasted all the *Tiding Time*, and then went off in gentle kindly Sweats in the *Ebbs*. I went on then to take Notice of the *Sex res non naturales*, and Alterations of the *Weather*, and such Accounts as I could meet with of Earthquakes, and sundry other things: And I have yet met nothing to hinder me from laying down this as a Maxim, That *Motion*, *Vigour*, *Action*, *Strength*, &c. appear most and do best in the *Tiding Senaries*; and that *Rest*, *Relaxation*, *Decay*, *Dissolution*, belong to the *Ebbing Senaries*.

The Motions of Diseases, and the Births and Deaths of Animals in different Times of the Natural Day; by M. Paschal. n. 202. p. 815.

VII. It is observ'd on our *Sea Coast*, with relation to Mr. Paschal's Observations, that People that are sick, change at the Turns of the *Tide* at the Place; so as this Notion has obtain'd among all the *Maritime Towns*. *Upland*, with us, it does not constantly hold; which may be thus accounted for; (if the *Moon's* Effect be *Fluidity*, as in Frosts is seen, a *New-Moon* ever thawing, and is agreeable enough to a neighbouring Body of so quick a Motion) upon *dry Land*, the *Moon* may not have the same Force; for I observe in Capt. *James's* Voyage at *Charleton-Island*, the Fixedness of the Winter

Deaths at certain Hours of the Tide, by Mr. Benj. Allen. n. 231. p. 667.

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ter Frozen Air occasioned the Difference of *Tides* at the *New* and *Full* to be scarce greater than the common *Neap* ones; whereas *Spring Tides* advanced with the *Summer*. I have observed *Agues*, *Tertian* I mean, to come when the *Moon* has come to an Angle, as in one or two exactly when the *Moon* was setting, and the succeeding *Fitts* when she culminated, the third *Fitt* at a *Rising Moon*, and so on. *Deaths* I have kept exact Account of; but can find no one Observation hold true, some at one time of the *Tide*, some at another.

VIII. *An Account of a Book omitted.*

n. 14. p. 254.

King Solomon's Portraiture of Old Age; by Jo. Smith. M. D.

C H A P. IX.

Pharmacy. Chymistry.

Three Queries relating to the *Entalia*, *Dentalia*, *Blatta Byzantina*, *Purpura* and *Buccina* of the *Shops*; by Mr. Sam. Dale. n. 197. p. 641.

Answered; by Dr. Lister. lb.

I. **WHAT** is the *Entalia* of the *Shops*? By what Authors described? Under what Names? And how they differ from the *Dentalia*?

2. Of what *Shell* is the *Blatta Byzantina*, the *Operculum*?

3. There are divers Sorts of *Purpura* among Authors, which is that of the *Shops*. Likewise which Sort of *Buccina* and *Umbilici Marini* ought to be used in the *Shops*?

II. 1. As to the *Entalia*, I do not remember to have seen any thing in the *Shops* under that Name. The Description of the *Dentalia* in *Schroder* are very faulty, and both those and the *Entalia* by him should seem to be the two Species of *Dentalia*, which are by me figur'd. The *Dentalium* being that which is commonly and in Plenty found about the Island of *Guernsey*, and elsewhere upon our Coast; and is the same with that found in the *Mediterranean*. It is a long, slender, round Pipe, a little bending and tapering, hollow and open at both Ends, without any Crack or Flaw, naturally white at one End, and usually a little reddish, very smooth and polish'd on the Outside, and from thence and the Figure, called a *Dog-like Tooth*. The *Entalium*, or other Species of the *Dentalia*, is very much longer and thicker than the former, much like in other respects, save that this is streak'd with high Ridges, and mostly of a greenish Colour. This Species I guess to come from the *Indies*. Note, That any thing that is wrought into, or channell'd, is in the modern *Italian* called an *Intaglia*; whence I believe, and the nearness of the Word *Dentalia*, arose those Distinctions of Names.

2. To the Second Query, I take the *Blatta Byzantina* to have succeeded the *Unguis Odoratus*, and to have been brought into the *Shops* in its place. In *Dioscorides's* Time, the best was brought from the *Red-Sea*, viz. the palest and fattest; the blacker and less, from *Babylon* or the *Persian Gulf*; but

but it seems later times took up with those found about *Constantinople*; whence the present *Shop Blatta* had its Name. The Name of *Blatta* is given to this *Operculum*, from the Colour I guess; as being of a dark Hair Colour, as the common *Blatta Piflinaria*, so common in *London*, is; also this being a broad, thin, flat Beetle, like the Cover.

'Tis true, the same *Dioscorides* says, the *Unguis* was an *Operculum* (ὀμαρυχύλιον) like to that of the *Purple-Fish*: He means what was used in his Time; in which it seems the *Unguis Odoratus* was lost, or was not brought to *Europe*. But it will appear out of the same *Dioscorides*, that the *Unguis* was no *Operculum*. It will be worth the while to make out this Mistake, and consequently the Error the *Moderns* have been in to substitute an *Operculum* of a *Marine Turben* for the true *Unguis Odoratus*.

Take the History of the *Unguis* out of *Dioscorides*: "It is found, says he, in the Lakes of *India* where *Narde* grows; wherefore the *Conchyli* feeding on *Narde* are *Aromatick*. It is gathered after that the Lakes are dry'd up with Summer Heat. He concludes, the *Conchylium* itself burned or calcined, is of the same Efficacy with the *Purpura* and *Buccinum* burnt." In the Chapter of *Narde*, he says farther, That the *Indian Narde* grew near the River *Ganges*, that is, in certain Lakes, which the overflowing of that River caused. Hence it appears, (1.) That the *Unguis Odoratus* was part of a fresh Water *Conchylium*. (2.) Now if it was gathered in the *Nardiferous* Lakes upon the River *Ganges*, how comes it to pass that the same was brought out of the *Red Sea* and *Babylon*? And why should the Shell itself be brought, an useless Luggage, so far, as from the River *Ganges* to *Greece*, the *Operculum* rarely being a Tenth Part of the Shell itself? Now if it was not used to be brought and exposed to Sale, to what Purpose was it to declare its *Vertues*, or how could the Experiment be made? I conjecture therefore, that the true *Unguis Odoratus* was something like the half of a *Pectunculus Fluvialis*, so common in the River *Thames*, of the Bigness and Thickness of my Thumb-nail, and that for these Reasons:

1. That the *Unguis Odoratus* seems to have been a fresh Water *Bivalve* or *Muscle*; for that they stayed till the Lakes on the River *Ganges* were dried up before they gathered them. Now *Bivalves* are ever buried in Sand and Mud, and never rise up and swim about and float as the *Turbinate Snails* do, to which latter only the *Operculum* belongs, and which therefore were always and easily to be caught.

2. He calls this Snail *Conchylium*, and by that general Name distinguishes it from all the other sorts, concerning which he treats in several Chapters; which though in general it take in both kinds, as well *Turbinate* as *Bivalve*; yet it does more particularly denote a *Concha* or *Bivalve*.

3. The *Onyx* is expressly reckoned by *Pliny* amongst the *Bivalves*. For (*L. 37. c. 11.*) he makes all these Synonymous, *Solen*, five *Aulos*, five *Donax*, five *Onyx*, five *Dactylus*. And again more particularly, (*Lib. 2. c. 61.*) he says, *Ex Concharum genere sunt Dactyli, ab Humanorum Unguium similitudine appellati.* So that in all probability the *Onyx Odoratus*, brought more anciently out of the fresh Water Lakes about *Ganges* in *India*, was not unlike

like the common *Onyx* of the *Mediterranean*, which was of the *Solen* kind.

Whatever the *Blatta Byzantia* of our *Shops* is, which has certainly nothing of the Characters of the ancient *Aromatick Unguis*, and which in all probability was lost upon the account of the difficult Passage from *Ganges* into *Europe*, I lament its Loss, which I have reason to believe was a good Medicine, from its strong *Aromatick Smell*; which is much wanting in our *Testaceous Powders*, of which this was one of the Number, so much used, and that not without good Reason now-a-days, which are all very flat and insipid.

To the *Third*, the *Purpura* of the *Ancients* is well made out, and figured by *Fabius Columna*: And it is one of the most common *Murices* of the *Mediterranean Sea*. In this he could not be much mistaken, because, as I remember, he somewhere mentions Heaps of those Shells where *Officina Purpura* anciently were; and also from the *Purple Sanies* the Fish yields of itself. He mentions one or two more Species of *Turbinatè Snails*, to be found in the *Mediterranean*, which yields a *Purple Juice*. Upon the whole Matter, it is indifferent what Sort of *Shell* we use in the *Shops*, if it be to be *Calcined*, provided it be a *Sea-Shell*. Nor do I find either *Dioscorides* or *Ærius* to have distinguished betwixt the *Ostrea Purpura* or *Buccinum* calcined; but gives them all the same *Caustick Vertue*; possibly some one Species may have it in a higher Degree, as we see the various Sorts of *Lime-Stones*, if calcined, differ in Strength.

One thing I shall not omit before I end this Paper, because it is now in my Mind, that tho' the Species of *Shell* or *Purpura* be scarce known to our *Shops* at this Day, yet the Use of the *Purple Juice* has been, by Tradition at least, transmitted down to our Times, and kept as a Secret even in these Islands, till Mr. Cole got hold of it, and publish'd it. Sir Rob. Southwell told me many Years ago, that his own Mother in *Ireland* was famous for Marking Handkerchiefs with the Juice of *Fish*; which Mark would never wash out. And the very Learned Mr. Jo. Beaumont informs me of a Passage in our *Beda's Ecclesiastical History* relating to the *Purple*, as a known thing in his Time. The Passage is as follows;

Fig. Vol. I.
Cap. VI. Sec.

Beda Hist. Ec-
cl. l. i. c. i.

Varis Conchyliorum generibus exceptis: in quibus sunt & Musculæ, quibus inclusam sæpe Margaritam omnis quidem Coloris optimam invenimus; id est, & Rubicundi & Purpurei, & Hyacinthini & Prasici sed maxime Candidi. Sunt & Cochleæ satis superque abundantes, quibus Tinctura Coccinei Coloris conficitur. Cujus Rubor Pulcherrimus nullo utiquam Solis ardore, nulla valet Pluviarum Injuria pallescere; sed quo vetustior, eo solet esse venustior.

You see from this Passage the *Purple Trade* of *Dying* was used in *England*, and very much valued.

Fig. 81.

Fig. 81. Represents the true *Purpura* of the *Ancients*, by the *Italians* called *Gerusolo*.

Stones in several
Animals; by
Mr. Wil. Clerk.
p. 250. p. 99.

II. Stones are not only found in *Humane Bodies*, but also in several Parts of other Animals, as *Bezoar Stone* found in the Stomach of a kind of *Goat* in both *Indies*; as also in the Stomach of *Monkeys*, (which is esteemed the best.)

best.) There is also a kind of *Bezoar* called *Cow-Bezoar*, found in the Stomach of a Cow; *Hippalithus*, found in the Stomach of Horses; *Ægagropila*, in the *Capra Alpina*, &c.

The Writers of the *Materia Medica* ascribed great *Vertues* to these *Stones*, and particularly the *Bezoar*, and have wrote large *Encomiums* upon them. But if *Physicians* would consider seriously the true Worth of them, they would find, that their *Vertue* proceeds more from their being brought from a *Foreign Country*, and a common *Vogue* and *Esteem* they have got in the World, than from any *Intrinsick Value* they have in the *Cures* of Diseases; and that which seems most to recommend them, is their *Extravagant Price*.

Much esteem'd by many Writers, but in truth of little purpose in Physick.

III. That some *Distillations* may be made by *Frosts*, I have this Proof: At my Request you were pleased to get me a *Thermometer* of a very small and slender Stem, especially the higher Parts for 10 Inches near the Head. The *Spirit of Wine* is very deeply tinged, which renders it in that Smallness clearly visible. I expos'd it out of Doors in the *Hardest Frosts* of the extreme Winter, An. 1665, when the Winds were also violently sharp. In those *Frosts* there ascended to the Top of the Glass small *Drops* like a *Dew*, which afterward in time descended into the Stem, and fill'd up the Space of an Inch or thereabouts, and it was as clear, and bright, and more flickering, than any *Crytal* or *Glass*. On the contrary, in the *Heat* of the *Summer*, I plac'd a stronger *Thermometer* of slow Motion on a sunny Wall, till a Part of the *Liquor* ascended into the Top, and there continued some Hours: Then by sloaping the Glass I divid'd it from the rest at a little distance: And this took up two Inches in the Stem, being at first of a very pale *Reddishness*. I guess it contain'd much of the *Spirit of Urine*, which at first was intermingled with the *Spirit of Wine*; but in a short time all the *Reddishness* was quite consumed: And since it remains of a transparent, but very dull *Clearness*, in no degree so bright and flickering as the other.

Cold Distillations; by Dr. Jo. Beal. n. 56. p. 1140.

Whether this may prove a *Distillation* of the same kind, and not differing from *Distillations* by *Heat*, I know not: But we are sure, that false *Grounds* and vain *Hopes* have done infinite Good to us, and to our *Posterity*, by *Pyrotechnie*: And why may not we accept of *specious Hopes* to attempt something in *Psychrotechnie*?

IV. After this Learned and Experienced *Physician* and *Chymist* had often with himself considered, what the Reason might be, why the chief *Chymical Operations* had been hitherto contemned, and by some reputed even for *Chimera's*; he affirms to have found at last, that the true Cause thereof is, that the *Artists* have not made use, as they should, of those Means and Ways, that would have made them successful. Now of those Means he assevereth, by his own Experience, these three to be the most eminent and the most admirable for Use, viz. *Digestion*, *Fermentation*, and *Triture*; Operations sufficiently discours'd of, but, in his Opinion, little understood as to

The great Use of Digestion, Fermentation, and Triture, by Dr. Joel Langelet. n. 87. p. 1080.

So 2 their

their Efficacy and Usefulness, which he here undertaketh to make out by some considerable and uncommon Experiments.

First then, He shews the excellent Usefulness of *Digestion* in the Preparation of the *Volatile Salt of Tartar*: Where having mentioned the Difficulties and Unsuccessfulness in other Processes, tried by him, he assures us, that as soon as he made use of a long *Digestion*, he succeeded so well, that the very first time he obtained, what he feared he should not have gotten by many *Cohobations*, which was a pure white *Volatile Salt of Tartar*, leaving behind a few quite insipid *Faces* of an Earthen Colour.

To this he adds another great Use of *Digestions*, in duly preparing the *Essences of Mineral Sulphurs*; instancing an Experiment made upon *Corals*, as most clearly of all representing that great Power of *Digestions*. He poured then, some Years ago, upon Fragments of *Red-Coral*, an *Oil*, which among all distill'd Vegetables is, as far as he knows, the mildest; desirous to try whether he could extract a *Tincture* therewith. But finding after a long time no Change at all in the *Coral* nor *Oil*, he laid by all Thoughts of it. But having one Winter other things to digest in a *Digesting Furnace*, he thought good to resume that *Coralline* Operation, and to give the *Bolt-head*, wherein that Matter was yet contain'd, a Place there, not without good Success. For within a Month's time, when he stirr'd it as he used to do, he perceived that the Bits of *Coral* had a higher Colour, and were grown softer, yet without any Change in the *Oil*. He therefore continued the same Degree of Heat, and after some Days saw, to his Wonder, that the *Corals* were altogether dissolved into a very Red *Mucilage*, yet the *Oil* still swimming upon them in the Pristine Form, without having received any *Tincture* at all. He did shake the Vessel vehemently and often, to see whether he could unite the *Oil* with the *Mucilage* of the *Corals*; but all was in vain, the *Oil* still ascending when the Vessel was at rest, and the *Mucilage* subsiding. Whereupon he try'd whether he could combine them by *Digestion*; but that also not succeeding, he pour'd off the *Oil*, (which he found to retain almost its former Scent and Taste) and pour'd upon the remaining *Mucilage* some *Tartarized Spirit of Wine*, of which by a short *Digestion* it was resolved into a highly Red *Tincture*.

By these two Experiments, the Author thinks, he hath made it evident of what Value the hitherto neglected Works of *Digestion* are; as also given a Hint of the great Efficacy there is in *Volatile Salts*, if they be fettered, and kept from Avolation.

Secoadly, To shew the Power and Use of *Fermentation* in Chymistry, he instances first in a true *Volatilization* of Salt of Tartar by means of the same; passing by what he hath performed thereby upon *Antimony*, *Pearls*, *Coral*, &c. He saith then, that to obtain the Spirit or the *Volatile Salt of Tartar*, he proceeded thus; he took of *Crude Tartar*, 2, 3, or more Pounds, (according to Pleasure) and first *Calcined* it slightly, and only to some Blackness, to have what is most necessary, a *Ferment* to ferment the *Tartar* with. Having put this into a large Pot, he poured on it so much Water, that it stood an Inch high above it. 1. Then he gave it at first a gentle

gentle Fire to make it *Luke-warm*; which done, he poured into it *half a Handful* of finely *Pulveriz'd Tartar*, and shortly after saw some *Bubbles* arise, that increased more and more. Which perceiving, he continued, as he had begun, at several times to pour in more *Powder of Tartar*, whereby the *Fermentation* was raised and quickened; the *Bubbles* thereupon rising in so regular an Order, as if they had been natural *Grapes*, the Colour excepted. But here he was to keep a very exact *Regimen* of the *Fire*, such as all *Fermentation* requireth; and took care also, lest by a too copious Affusion of the said Powder, the *Ebullition* should grow too vehement, and the Pot run over. The *Fermentation* ceasing, he put all that was in the Pot into an *Iron Bolt-head*, (a *Glass* one being in danger to be broken) to which he often applied a wet *Linnen-Cloth*, thereby to hinder a too great *Boiling* up of the *Fermented Tartar*, which else will suddenly run up and pass into the *Recipient* itself. Wherefore the *Fire* is also very carefully to be governed, and increased by little and little; thought at last it must be strong, to force up all the *Salt*. Which being observed by him, he found the *Gross and Feculent Tartar* by the said *Fermentation* so *Volatiliz'd*, that there remain'd not any *fixed Salt* in the *Caput Mortuum*; which, he saith, he hath experienced more than once. He adds, that the *Liquor* obtained from thence, having much *Water* in it, added for the *Sake* of the *Fermentation*, is also to be much *rectified*, and that so far till it appear whitish; which shews that it holds a due *Quantity* of *Volatile Salt*. Which *Salt*, of what *Value* it is, this Author would have us to estimate from the *Testimony* of *Van Helmont*, c. 15. de Feb. p. m. 780. and from the wonderful *Vertue* himself saith to have found in it, both in *internal* and *external Affections* of the *Body*, and even in *Gangrenes* themselves; besides, that by means thereof he hath prepared some *Essences*, which in vain he had tried to make some *Menstruums*.

Another Instance he gives us of the great Use of *Fermentation* in separating *impure* and *noxious Sulphurs*, which he prescribeth to try in *Opium*, whereby, according to him, it becomes not only a very *safe Medicine*, but also a highly useful one for many Cases, if rightly used.

Take then, saith he, of true *Theban Opium*, sliced, 1 *Pound*; and pour upon it in a low *Cucurbite* 10 *Pounds* of fresh *Juice* of *Quinces* very ripe, adding to it 1 *Ounce* of pure and very dry *Salt* of *Tartar*; expose it to a gentle Heat for a *Day* or two, until there appear some *Bubbles*, which is a Sign of the *Fermentation* at hand. Then, to further the same, add four *Ounces* of *Sugar* very finely pulverized, and observe still such a Degree of Heat, as the *Fermentation* requireth; which by so doing will duly proceed, and you shall see the *Opium* manifestly rise and dissolve *per minima*; taking heed mean while of the strong-scented *Stupifying Sulphur*, which then is wont to steam out. You'll then also see a Part of the *impure Volatile Seum* to emerge at the Top, and the more *Terrestrial* to subside at the Bottom of the Vessel; the purer Part staying in the Middle, which is a *Red Liquor*, like a *Ruby* Transparent; which you are with Care to separate, *filtrate*, and by a due *Distillation* to thicken to the Consistence of *Honey*. And this you must again dissolve by an highly *rectified Spirit* of *Wine*, *filtrating* it, and
digesting

digesting it for a *Month*, that whatsoever of *Crude* there may yet be in it, may be by that *Celestial Fire* ripened and brought to *Perfection*. This *Spirit* being abstracted to a due *Consistency*, you will find this *Essence* to be of that *Virtue*, that the 4th Part of a *Grain*, or at most half a *Grain*, taken in a proper *Vehicle*, moist or dry, will perform very wonderful Things.

3. Having dispatch'd *Digestion* and *Fermentation*, he comes now to *Trituration*; by which alone he esteems many great and admirable things may be perform'd in *Chymistry*: To which he is persuaded he shall very easily obtain the Assent of all those, that shall but observe and well consider the two following *Operations*, both experimented in the *Laboratory* of *Gottorp*, in the Presence of the late Duke *Frederick*, a Prince exceedingly well vers'd in all kind of Knowledge, especially that of *Chymistry*.

The first *Operation* was made upon *Gold*, which, though the most fixed of all Bodies we know, was, though it will not yield to *Fire*, nor to any other known *Dissolvent*, mastered by *Grinding*; which he assureth himself to have been an Eye-witness of. But this he did by means of a singular Instrument, by him call'd a *Philosophical Mill*, whose Structure is thus describ'd.

Fig. 31.

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|---|--|
| A, A Leaden Head pretty thick. | a, The superior Part of the Axis, which is round. |
| B, The Axis. | b, The inferior Part of the same, which is square. |
| C, An Indented Drum. | c, d, Here both the Pestles are affixed to the Axis. |
| D, A Drum consisting of Coggs. | e, Here the Pestles are strengthened by a strong Brass Ring. |
| E, A Mortar. | ff, Here both Pestles are strengthened by two Brass Cases. |
| F, Pestles. | gg, Both the thick Pestles of Glass. |
| G, A Handle, by which the Mill is turn'd. | |

The Operation itself follows.

Put *Leaf-Gold*, as much as you please, cut very small, into a very thick *Glass-Mortar*, or into one of *Gold*, (such an one as the late *King of Denmark*, a little before his Death, caused to be made for this Operation.) In this *Mortar*, covered only with Paper, lest any Dust or other thing should fall in, grind the said *Gold* Night and Day by an uninterrupted Agitation of the Mill, till you see it reduc'd into a dusky Colour. For which *Grinding* there are commonly to be allowed 14 *Days* and *Nights*. But if you will only work by Day, there will need a whole *Month*. This done, put the Powder into a *Retort*, not very deep, but shallow, such as the *English* ones use to be; and drive it by a *Fire of Sand* by degrees, but at last by a very strong one; and there will come over a few, but very red Drops; which being digested either *per se*, or with *Tartarised Spirit of Wine*, give you a true *Aurum Potabile*, which is sincere, and unimbu'd with any Foreign Quality.

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The Remainder, though they could also have easily resolved by Grinding; yet they thought good to make an *Extract* of it by means of their *Philosophical Acetum*, made of *Verdigrease*, *Sulphur*, and a highly rectify'd Spirit of *Wine*, by a long *Digestion*: Whereby they got again a *Tincture* sufficiently Red, and of very great Vertue. And that little that remained, which was but very little, they reduced into a Body by the means of *Borax*; but it wanted its due *Weight*.

'Tis true, saith our Author, that at the first View this Operation seems to be gross, requiring much Time and Labour, but little *Art*; but well considered, 'tis highly admirable, being assisted by the wonderful Salt of the Air, as the only *Catholick Dissolvent*. And that Salt is by the continual Grinding attracted and intermixed, many other *Experiments*, made by him about it, have taught him, which he reserves for the Publication hereafter to be made, of the things done in the *Gottorpian Laboratory*.

The 2d Experiment of the Use of this Grinding, was in a true and genuine Preparation of the Mercury of *Antimony*: A Process affirmed not only made by himself before his Prince, but also by the Hands of that very experienced Chymist of the Elector of Saxony, *Johannes Kunchelius*.

The Operation consists in this; grind first the *Regulus* of *Antimony* into an impalpable Powder; and to 1 Pound of it, add 2 Pounds of very pure and dry Salt of Tartar, and 8 Ounces of *Sal Armoniack*; and mix it well together. Then moisten it with some Urine of an healthy Man, especially of one that drinks Wine, if such may be had; and take Care to have this Mixture ground for a whole Day together without any Intermission by two very strong young Men; always, if there want Moisture, sprinkling Urine upon it, that it may stand 3 Inches high over it; and closing it well, keep it in Digestion for a whole Month, daily shaking it. And if during that time the Mass appear to be dry, pour on more Urine. The Digestion being ended, form the Matter into Globules with equal Parts of beaten Glass and Calx vive, and dry it in the Shade. Of these, extract the Mercury in manner following;

Let there be ready an oblong Iron Vessel, like a Bolt-head, into which pour Cold Water, and dig it into the Ground: Upon it put an Iron Plate with many Holes in it, and lay thereon the said Globules well dried; then fit also an Iron Head, somewhat flatted, to it, that you may conveniently lay Coals thereon, and thus keep a moderate Fire for 4 Hours; then increase the Fire for as many Hours, unto the last. After that, let it cool, and beware not to stir the Vessel digged in the Ground, nor to pour out the Water, before that be altogether cooled; or else you will lose a great deal of the Mercury; as happen'd, it seems, to our Author, when his Prince, being impatient of Delay, commanded the Water to be poured out before it was time: For the Mercury, being by so strong a Fire resolved into Atoms, is to be coagulated again by Cold.

This Mercury of *Antimony* our Author glorieth in, as having prepared and handled it with his own Hands, and seen it with his own Eyes, after the finished Distillation, running in the bottom of the Vessel. Neither doth he care if
any

any do call it a *Non-Entity*, or if any unwary Laborants be unsuccessful in the *Operation*: It is sufficient to him, that he hath alledged nothing but what he hath tried himself, and candidly described. He wisheth such *Operators* to consider, how many things there are to be observed before and in the *Operation*, and even after it, if you will be certain thereof. Which, he saith, may plainly appear even by the *Operation* of the *Tartar* alone; for as much as all *Tartar* is not equally good, and himself hath met with great Diversity of the same: Besides which, great Care is to be had of the *Fermentation* itself of the *Tartar*; for if it be not duly made, the *Tartar* will not be resolved *per minima*; nor will the Grapes be represented in that natural Shape they ought to be; nor will all the *Salt* (which is the main thing) be *Volatilized*. Farther, if perhaps the *Fire* be excessive, during the *Distillation*, much of the *Volatile Salt* will be burnt up, and it will yield a strong smelling *Spirit*.

Having dispatch'd this, the Author subjoins an Account he met with among his Papers, of another Way of *Operation* of *Grinding of Gold*; which though he hath not yet tried, yet it seeming to him very likely to succeed, he scruples not to communicate also. The Instruments to be used therein, he describes thus:

Fig. 83.

a, A *Mortar* of very fine *Steel*.

b, A *Body* serving for a *Pestle*, of the same *Metal*, which is the *Mortar*; as 'tis delineated in the *Figure*.

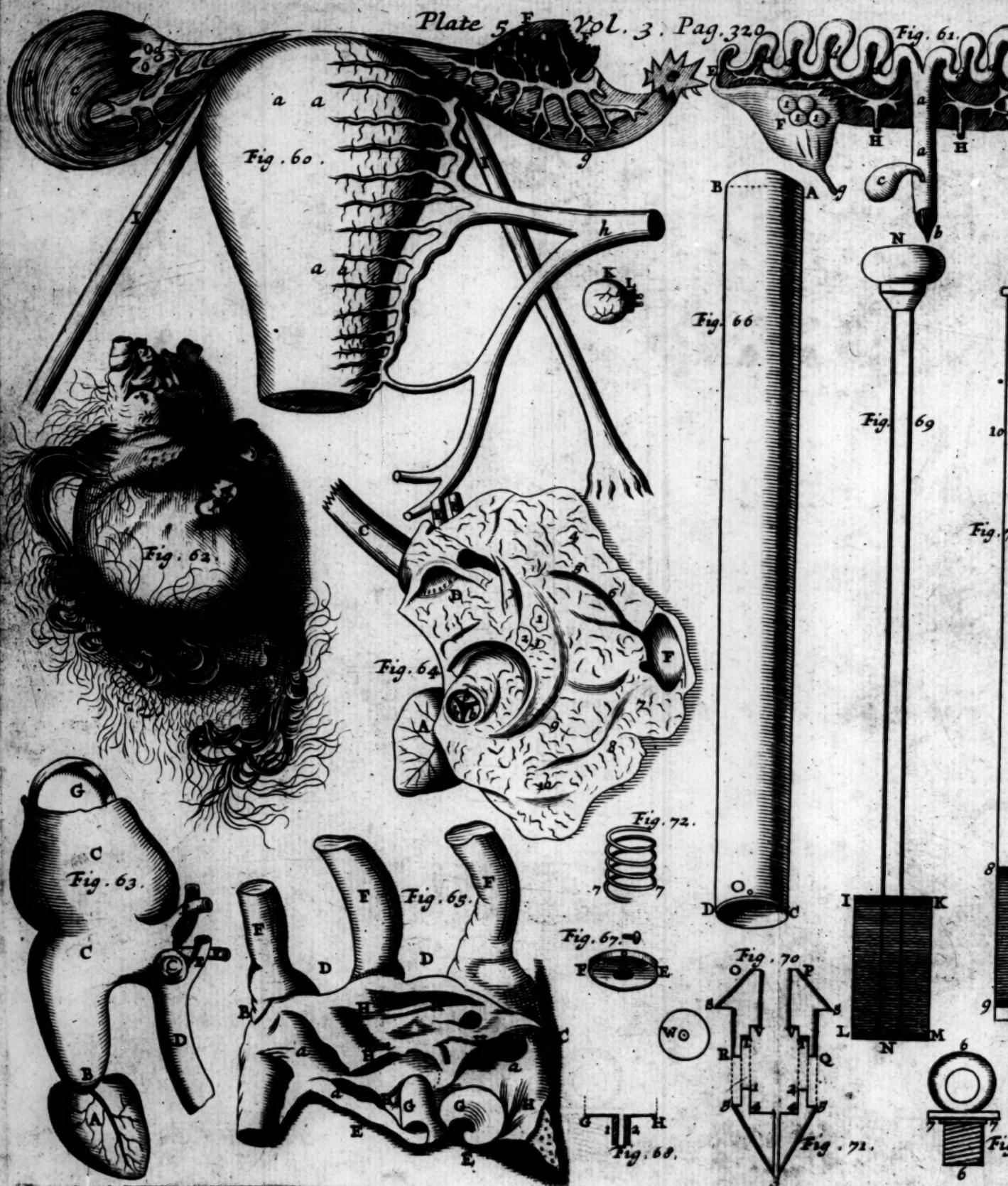
c, Is a small Space, where is interposed a *Golden Plate* half a *Ducat* thick.

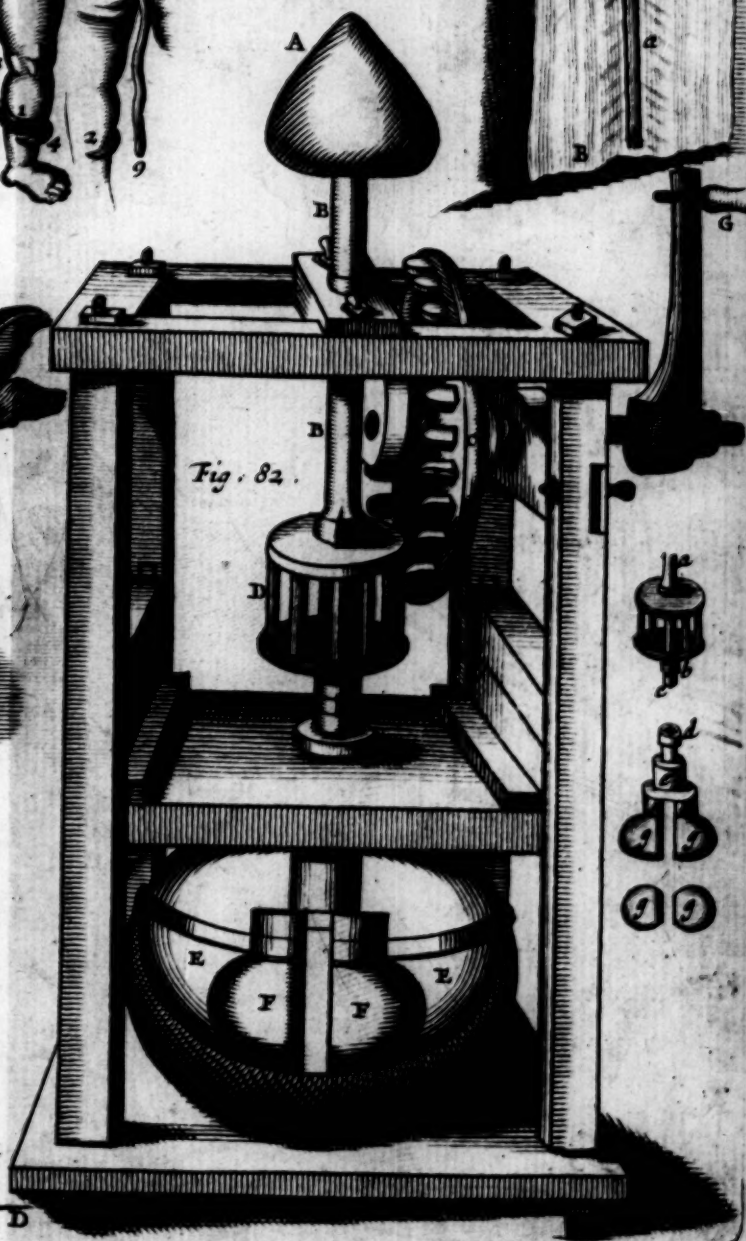
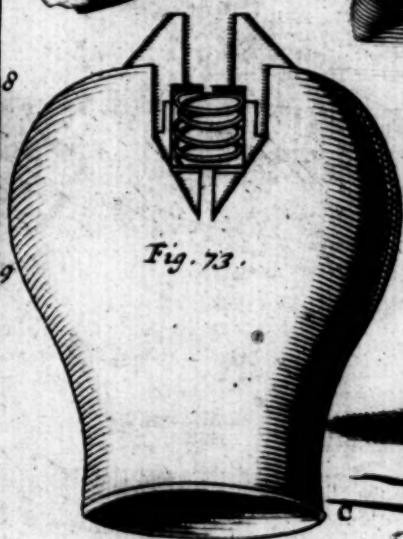
d, The *Handle*, by which the *Pestle* is to be managed in the Work of *Grinding*, which is to be continued for 3 *Weeks*; at the End of which the *Gold* will be resolved into a *Potable Liquor*.

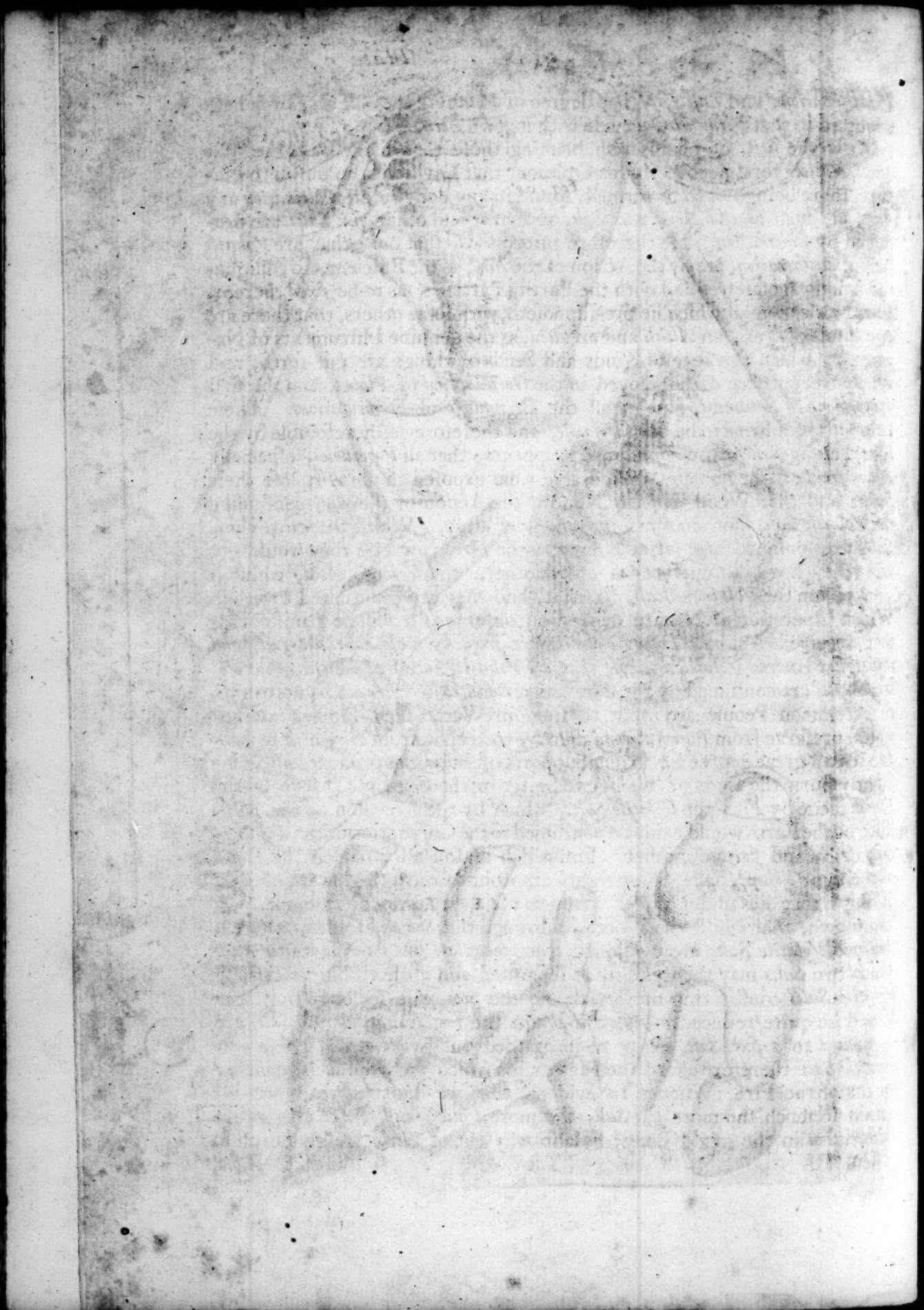
This Way, as it is much simpler, so 'tis by the Author esteemed much more expedient than the former, by reason of the *Sulphury Saline* Quality of *Iron*, which by *Grinding* being opened and highly subtilized, acts the more powerfully upon the most solid Body of *Gold*, and attracts withall the *Salt* that is in the *Air* in greater Plenty, than can be done in a *Glass* or *Golden Mortar*. And if it be objected, that by that long continued *Grinding* the *Steely Particles* are worn off, and commixed with those of the *Gold*, the Author would have it considered, how great a *Cognition* there is between those *Sulphurs*, and also how great is the Use of *Digestion*, separating the Pure from the Impure, and withall exciting that occult *Fire* of *Mars*, well known to the true Searchers of Nature; which being assisted by the *Alcohol* of *Wine*, is able to concoct the little immature Portion to a due *Maturity*.

The Volatilization of Salt of Tartar elucidated; by Dr. Dav. von der Beche. n. 92. p. 5185.

V. This Author having (as he affirms, and as will appear by the Sequel,) formerly taken Pains in the *Fermentation* of *Tartar* for the *Volatilizing* the fixed *Salt* thereof, he endeavours here to declare his Thoughts about the Causes of his undertaking that Labour, and of the Manner how that *Volatilization* is performed. In the doing of which he labours to shew, First, The Causes of the *Fixation* of the *Salt* of *Tartar*: Secondly, The Reasons of the *Vola-*







Volatilization; and Lastly, What degree of *Volatility* the *Salt of Tartar* hath acquired in that *Fermentation* made with its own *Ferment*?

As to the *first*, he begins with blaming those that divide *Salts* into *fixt* and *Volatile*, forasmuch as, in his Opinion, that Division is unknown to Nature, there being not to be formally found in any Body before *Calcination* any *fixt Salt*, such as the *Alcalizate Salt* of *Tartar* and other *fixt Salts* are produced by *Calcination*. He therefore informs us, that *Salts* that are *Volatile* before *Incineration*, are by the Action of the *Fire*, as the Efficient, so colliquated among themselves and with the Earthy Particles, as to be *fixed* thereby. For the clearing of which he pre-supposeth, with some others, that there are two kinds of *Salts*, an *Alkali* and an *Acid*, as the genuine Instruments of Nature, by which the several Kinds and Seeds of things are put forth, and which every where are employed in the *Germination* of *Plants*, and the first Conceptions of *Animals*, and in all the *Beginnings* of *Fermentations*. These two *Salts* he affirms to be both *Volatile*, and therefore easily resolvable by the supervening *Salt* of the *Air*: Since it appears, that all *Vegetables*, especially *Aromatics*, if they be any considerable time exposed to the *Air*, lose their *Salts*; and that Wood in particular, by the Action of the *Air*, consuming the *Volatile Salt*, doth in time quite moulder away. Whilst therefore these *Salts* are loosened and set at liberty by the *Fire*, (for else they would not act) they begin to operate on one another; the *Volatile Acid*, whilst it works upon the *Volatile Alkali*, fixeth it, and they are colliquated together. Which Operation of Nature being well observed, it will be manifest that that received Axiom, *Things Volatile are fixed by those that are fixt, and things fixt rendred Volatile by those that are Volatile*, is false. Now, that *Volatile Salts* are consumed by the *Air*, and colliquated by *Fire*, is so notorious, that common People are wont to sink in Water such Timber as they would preserve from *Putrefaction*, thereby to keep it from *Air*, and to harden it to a great degree for strong Supports of Buildings. Hence also they slightly burn the Ends of Timber to be set in the Ground, that so by the *Fusion* made by *Fire*, the *Volatile Salts*, which by the Accession of the Moisture of the Earth would easily be consumed to the Corruption of the Timber, may catch and fix one another. For which reason also, namely the *Fusion* of the same *Volatile Salts*, Shipwrights are wont to burn the lowermost Part of Ships that lies under Water. And to use a very common Instance, *Soot*; 'tis known, that whilst the Wood is burning, the *Smoak* ascends, wherein the two *Volatile Salts* are contained, that coagulate one another into *Soot*, which two *Salts* may thence easily be separated and made visible; and these *Volatile Salts* constituting the *Smoak* and the *Soot*, rise so long, until the Wood be quite reduced to *Asbes*, in which the remaining *Volatile Salts* are colliquated to a *fixt Salt*, easily to be washed out by Water. These two *Volatile Salts* therefore afford the Matter, of which the *fixt Salt* is made by means of the *Fire*: Whence 'tis evident, that we must (as really we do) obtain so much the more *fixt Salt*, the more *Volatile Salt* there was before *Incineration* in the mix'd Body; as also why out of *Herbs* freshly burnt to

Ashes, we get a greater Quantity of *fixt Salt*, than when they have been dried up; because the *Air*, by its Operation, (which is somewhat advanced by the Moisture in the Plant itself dissolving the *Salts*) hath robbed them of the greatest Part of their *Volatile Salts*. Upon which same Account, Wood, decayed and mouldered away, contains almost no *fixt Salt*, as it hath also lost almost all its Weight.

Having thus shewed, that before *Incineration* there is found in mix'd Bodies no *fixt Alcalizate Salt* at all, and how the *Volatile Salts*, by *Calcinati-on*, are brought to *Fusion* and so *fixed*; the Author, farther to make out the *Fixation* of such *Volatile Salts*, takes Notice of the Mixture of *Earthy* Parts in such Bodies, some of which, when those two *Volatile Salts*, thus opened by the *Fire*, act on one another, are *coagulated* with them. Which he conceives to be the Case, when the said two *Salts* being concreted in the *Kidneys*, they by their Asperity wound the Sanguinous Vessels, (whence the *Nephritick Pain*) and so *coagulate* together with them the extravasated Blood, which makes the *Stone* of the *Kidneys* *reddish*; as the *Stone* of the *Bladder* is *whitish* from the Mucous Substance of the *Bladder*, therefore given it by Nature, lest the sharp *Urine*, by working upon its Membranes, should cause Pain, being *coagulated* together. And so he observes that the *Stones* concreted in the *Bladder* of *Gall*, taste bitter, by reason of the *Gall* that is *coagulated*.

This *Earth* then, when by the *Fire* 'tis intimately united with the *Salts*, and has been in a manner *vitri-fied* with them, keeps them so close together, that they can no more rise and fly away, than Birds fastned to a Rock; those *Salts* being rendred so *fixt*, that by a gentle *Fire* they are not so much as at all moved; by a strong one, brought to *Fusion*; and, united with a considerable Quantity of *Earthy* Particles, by an extreme Degree of Heat *vitri-fied*. So if you mix *fixt Salt* of *Tartar* with *Cinnabar* or *Antimony*, or with *Quick-silver*, all the *Quick-silver*, though a very ponderous Body, will pass into the *Retort*; but the *Salt* of *Tartar*, by reason of its *Earth*, remain at the Bottom of the Vessel. Whence he esteems it evident, that the *fixt Al-calies*, especially that of *Tartar*, cannot, by reason of the *Colliquation* of the *Earthy* Parts, penetrate into Bodies to be dissolved, nor consequently remove the inmost Seeds of Diseases.

Now, in the *Second Place*, though the *Volatilizing* such *fixt Salts*, and particularly that of *Tartar*, hath been hitherto found a very difficult Work; yet doth our Author conceive it would be very easy, if we took but Nature for our Guide, and but separated from *Salt* of *Tartar* the *fixing Earth*, that has been proved to be mixed with it; for the doing of which, he refers to the Prescript of Dr. Langelot, requiring that the *fixt Salt* of *Tartar* be mixed with its genuine *Ferment*, viz. *Crude Tartar*, or (if in the *Fermentation* you have a mind to see the *Grape like Bubbles*) *Cream* of *Tartar*, and so exposed to *Fermentation*. In which Commixture of *Ferment*, he would have this especially observed, that it be mixed to the very degree of *Saturation*, and until the fermenting Agitation and the Motion of the *Saline* Particles do cease, as a Sign that there is not any Particle of the *fixt Salt* of *Tartar* left unconjoin-
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ed with the *Acid* Particles of the *Crude Tartar* or its *Cream*, nor any *Acid* Part of the *Crude Tartar* not saturated by the *fixt Salt*. Which being observed, the *Distillation* will, the Action of the *Saline* Particles being thus stopped, the more securely be done. Mean time, that only the *Acid* Particles of the *Crude Tartar* are laid hold on by the *fixt Salt*, and not the *Alcalizate*, he promises a Proof of hereafter.

But since the main Question is about the *New Volatilization* of the *fixed Salts*, the Author is altogether persuaded, that in his *Fermentation* of *Tartar*, 'tis not chiefly the very *fixed Alkali* of *Tartar* that is again volatilized, but rather the added *Ferment*, which is the *Crude Tartar*. For in this *Crude Tartar*, though there be no *fix'd Salt* in it, (which he hath asserted generally of all Mixts) yet the *Volatile Alcalizate* Particles of the *Tartar* are detained by the *Volatile Acids* of the same, commixed with it to the very degree of Saturation, whence they are *fixed*; forasmuch as these two, when conjoined, do fix one another; when separated, become again *Volatile*. Which manner of *Fixation* he calls *Natural*, being shew'd us by Nature; as that which is made by the *Colliquation* of the *Earth* by Fire, *Artificial*, because only performed by Art; upon the Account of which, *Volatile Salts* are detained no otherwise, than Birds tied to a Rock are restrained from flying away.

Now, though indeed the *fixed Alkali* of *Tartar* is in this *Fermentation* freed from that *Earth*, to which, by the *Fusion* of the *Fire*, it was intimately united; yet notwithstanding this, 'tis *fixed* again, saith he, by the *Acid* of the *Tartareous Ferment*. For the clearer Proof of which, he makes use of the *Urinous Spirit* of *Sal Armoniac*, in which there are two *Volatile Salts*, an *Urinous* and *Acid*. These two *Salts*, saith he, though they be *Volatile* when separate, yet when united they detain one another, emulating as 'twere the Nature of *fixt* ones, since they are neither dissolved in the Air, nor emitt any Odour, as true *Volatiles* are wont to do. Now to obtain out of this *Salt* the *Urinous Volatile Spirit*, there is requisite a Separation of these two *Salts*; for this Bond being dissolved, the *Urinous* immediately riseth. To obtain which, Water is poured upon the *Sal Armoniac*, (because *Salts* act not but when dissolved) and then there is added a *fixed Sal Alkali*, which, whilst 'tis joined with the *Acid* Portion of the *Sal Armoniac*, (for the more *fixed Acid* is sooner united with the *fixed Alkali*, than with the *Volatile*) the *Volatile Urinous Part* quickly deserts its fellow *Acid*, and being conjoined with the Water, yields a most *Volatile* and Piercing *Spirit*; which tho' the *Sal Armoniac* before the Commixture of the *fixt Salt* was quite inodorous, yet now, after the Addition thereof, strikes the Nose most violently, and that even when put from the *Fire*; insomuch that if you do not, after the mixing of the *fixt Salt*, very accurately close your Vessel, you will afterwards find no *Spirit* at all. Wherefore, as in this Example of *Sal Armoniac*, the *fixt Salt* added, freeth the *Alcalizate* Portion of the *Salts*; so in this *Fermentation* of *Tartar*, the *Tartar* calcined to Blackness, or the *fixt Salt* of *Tartar*, freeth the *Alcalizate Part* of the *Crude Tartar* from the *Acid Parts*. For, saith he, in the *Crude Tartar*, or its putrefied *Cream*, there are, as in *Sal Armoniac*, two *Volatile Salts*, an *Alkali*, and an *Acid*, from the *Colliquation* of

which (as hath been said) the *fixt Salt* results: Since 'tis notorious, that in the *Fermentation* of *Wine*, the *Acid Particles* do *coagulate* the superabounding *Alcalizate* with the *Terrestrial* ones to the very degree of *Saturation*, and so by their increased *Weight* take place in the lower Part of the *Vessels*.

If therefore to this *Tartar* pregnant with *Salts*, *crude* or *depurated* by a *Solution* in *Water*, you add a *calcined Tartar*, or, which is the same, *Salt* of *Tartar* itself, immediately this *fixed Salt* will lay hold on the *Acid* Portion of the *Crude Tartar*, and, as in the *Sal Armoniac*, so here, free the *Volatile Alcalizate*; from which *Conflict* and *Action* of the *Salts* on one another, *Grape-like Bubbles* will arise. And this *Injection* of *calcined Tartar* must be continued, until all *Fermentation* do cease, that is, to the very degree of *Saturation*: Which unless it be well observed, many *Inconveniences* will obstruct the *Operator*. But this *Volatile Alkali*, being by means of the *calcined Tartar* freed from its *Acid*, (like the *Urinous* of the *Sal Armoniac*) will presently fly away. Wherefore if this *Volatile Spirit* could forthwith be received, it would afford a real *Volatile Salt* of *Tartar*, especially if by *Art* it were freed from its *Phlegm*, (which makes it a *fluid Spirit*) and without the *Addition* of any extraneous thing *coagulated* into *Salt*. But this cannot be, saith he, seeing that, before all the *Fermentation* and *Motion* of the *Saline* Particles shall have ceased, this *Mixture* cannot be put into the *Cucurbite*, because it would break the *Vessel*; nor can the *fixt Salt* be added to the dissolved *Crude Tartar* all at once, but at several times, because else all the *fermented* Part would quickly get out at the *Edges* of the *Cucurbite*. Now then, since every time there is, by the *Addition* of *fixt Salt*, so much of the *Volatile Acid* freed out of the *Crude Tartar*, as much as there is added of *fixt Salt*, and that presently flies away; it certainly follows, that, if by *Injections* several times repeated you come at last to the *Point* of *Saturation*, there will remain no *Volatile Alcalizate Salt* at all of the *Crude Tartar*.

Since therefore there is no *Hopes* of obtaining the *Volatile Salt* from *Crude Tartar* this way, we must endeavour to get it by an *Addition* of *Tartar calcined*, or *fixt Salt*; and how this is to be done, hath been already intimated, viz. by the *Separation* of the *Earthy* Parts. For as the *Volatile Alcalizate* Particles, upon a very vehement *Colliquation* of the *Fire*, are, by an intimate *Union* with the *Earthy* Parts, kept from ascending; so also, when freed from these *Terrestrial Fetters*, they are restored to their former *Freedom* and *Volatility*. And this *Separation* of the *Earth* we obtain by this *Fermentation* of the *Tartar*; for, in the same *Moment* that the *Acid* Portion of *Crude Tartar* is conjoined with the *Tartar's fixt Salt*, to set the *Volatile Alkali* of the *Crude Tartar* at liberty; there is also made a *Precipitation* of that insipid *Earth*, which by the extreme degree of *Fire* was united with the *Salt* of *Tartar*, and had *fixed* it before.

But to expose this *fixing Earth* to the *View* of all, I shall alledge the Example of *Vitriolate Tartar*, known to the very *Apprentices* of *Apothecaries*. In this *Operation*, whilst the *Spirit* of *Vitriol* is affused to the dissolved *Salt* of *Tartar*, or its *Oil* made *per deliquium*, you may observe a very great *Effervescence*,

science, during which, and the Action of the *Acid* of the *Vitriol* upon the *Alkali* of the *Tartar*, there is precipitated an *Earth*, (for the Separation of which, Care is to be had of the Degree of *Saturation* between the *Spirit* of *Vitriol* and the *Salt* of *Tartar*) which afterwards may be severed by *Filtration*. Now that this *Earth* is precipitated, not out of the *Spirit* of *Vitriol*, but rather the *Salt* of *Tartar*, none vers'd in these things can be ignorant of. This precipitated *Earth* some call the *Magistery* of *Vitriolate Tartar*, and very imperitently prefer it often in their Prescriptions to the true *Vitriolate Tartar* itself. This *Earth* indeed hath a *Saline Taste*; but these *Salts*, as is usual in all *Precipitations*, did only adhere to the Matter precipitated, and may, by a repeated Ablution, be easily separated; which done, there remains nothing but an utterly insipid *Earth*, which can have no other Vertue but that of *Exsiccation*. Wherefore, after the self same manner, whilst the *Acid Part* of the *Crude Tartar* is united with the *Alcalizate* of the *Salt* of *Tartar*, the *Earth* also of the fixt *Salt* of *Tartar* in the said *Fermentation* will be precipitated.

The greatest Difficulty being thus dispatch'd, our Author proceeds, in the 3d Place, to a lesser yet remaining, which is, that the *Acid Part*, by means of which the *Earth* was precipitated, detains the *Volatile Alcalizate Part*, and fixeth it anew; so that his *Volatile Salt* of *Tartar* hath hitherto acquired no greater degree of *Volatility*, than *Crude Sal Armoniack*, or the *Flowers* thereof are known to have. For these, though they are made up of *Volatile Parts*, yet they diffuse no *Odour* before the Separation of the *Volatile Parts*; they also endure the *Air*, which no *Volatile Salt*, truly such, will do: Wherefore they cannot yet be reckoned among *Volatiles*, strictly so call'd.

Now then, to give to this *Volatile Alkali* of *Tartar* the last and highest degree of *Volatilization*, the Author esteems it necessary that there should be made a new Addition of fixt *Salt* of *Tartar*, which, in the same manner as before it had freed the *Alcalizate Part* of *Crude Tartar* from its *Acid*, must here also take from the manifest *Acid* of *Crude Tartar* the *Alcalizate Part* of the fixt *Salt* of *Tartar*, already freed from *Earth*; whereby this *Alcalizate Part* of the *Salt* of *Tartar*, truly *Volatilized*, being joined to the *Water*, (which was before added for the free Action of the *Salts*) will constitute a most *Volatile Spirit*, which, he saith, is *coagulable*, without Addition, into *Volatile Crystals*, having the perfect Taste of *Tartar*.

VI. P. Fr. Lana, having extracted out of a *Metallick Substance* a very white Salt, the same was, upon the Application of the gentlest Heat, resolved into a Golden colour'd *Liquor*; which being remov'd from that Warmth, as soon as it felt the cool *Air*, and even by opening the *Glass* wherein it was inclosed, did in a Moment shoot afresh into the same Salt: And that (which seemed oddest) whilst he was pouring it out of one *Glass* into another during its Fluidity, it was dispersed all over the *Glass* it was poured into, suddenly congealing into most fine *Threads*, many of which were extended from one Side of the *Glass* to the other, and hanging as 'twere in the *Air*, form'd just like the subtillest *Cob-webs*, not at all rigid, but by reason of their exquisite Subtily pliable, and scarce perceivable by the Eye,

An odd Salt
extracted out of
a Metallick
Substance, by P.
Fr. Lana. n. 79.
p. 306.

VII. Take

Volatile Salt
and Spirit ex-
tracted out of all
Sorts of Plants;
by Dr. Dan. Cox
n. 100. p. 7002.
n. 101. p. 4.

VII. Take in warm Weather a considerable Quantity of the *Leaves* of any *Vegetable*, stripped or pulled from the greater Stalks, lay it on a Heap, pressing it pretty close together; they will soon become very hot, especially in the middle, and after a few Days resolve into a Pappy Substance; (excepting the outward Leaves) which being made into Pellets, and put into a *Glass Retort*, and distilled, will yield, besides a great Quantity of *Liquor*, much thick Black Oil, of a Balsamick Consistence. The *Liquor* being separated from the Oil, and distilled in a tall *Glass Body*, a *Volatile Spirit sublimes*, which, after one, two, or three *Rectifications*, becomes perfectly *Urinous*, not to be distinguish'd, by *Smell* or *Taste* from well-rectified Spirit of *Harts-horn*, *Blood*, *Urine*, or *Sal Armoniac*.

I never made Trial of any *Herb* which, thus ordered, did not yield the mention'd Substances; altho' I have examin'd many, by this Method of Procedure, which seem'd very different from each other, as well in sensible Qualities, as those vulgarly call'd Occult; such as *Rue*, *Sage*, both *Celandines*, *Carduus Benedictus*, *Tobacco*, *Stinking Orach*, *Garden Scurvy-Grass*, the lesser *Spurge*, *Baum*, *Mint*, *Tansy*, *Camomil*, *Monk's Rhubarb*, several *Docks*, and even common *Grass*, with many others, which it were altogether unnecessary to enumerate; besides *Flowers* of *Elder*, *Paony*, *Cowslips*, *Clove-Gilliflowers*, &c. with several Sorts of *Mosses*, and *Rudiments* of *Vegetation*; which last is a green Substance on the Surface of the *Earth*, in *Rivers*, *Cisterns* where Rain often falls, and on *Ships* between Wind and Water, very apt to run into *Moss* and *Fibres*.

Note, 1. The *Vessels* wherein these *Distillations* were performed, though exceedingly well washed with Water, scoured with common Salt, Sand, Ashes, Soap, fixt Salts, &c. and afterwards exposed many Years unto the Air, Wind, Rain, Dews and Frosts, yet nevertheless retained a very strong *Smell*, not much unlike that of *Musk*.

2. The Water left at the bottom of the *Glass*, after the first *Rectification*, was somewhat *Acetous*; especially when the *Herbs* were not sufficiently fermented.

3. If the *Herbs* are duly fermented, they leave little *Caput Mortuum*, sometimes not a 20th, and never, by my Trials, above a 10th Part; whereas distilled before *Fermentation*, they leave much more: And this remaining Coal burnt to Ashes, yields scarce any *Alkali* or fixt Salt.

4. The *Volatile Salt* is much more than the fixt Salt would have been, afforded by the Herb incinerated the ordinary way.

5. All those *Herbs* which yield store of fixt Salt, such as *Wormwood*, *Carduus*, *Mugwort*, *Sage*, &c. do likewise, being thus managed, afford plentifully a *Volatile Salt*.

6. These *Volatile Salts* being highly rectified, did not, that I could perceive, differ from each other; as neither do *Vinous Spirits* of fermented *Vegetables*, or their fixed Salts highly purified and rectified.

7. During the *Fermentation*, the Room would be strongly perfumed; at the Beginning, with the *Natural Scent* of the *Herb*, if it had any enimently peculiar

peculiar *Smell*; in the Middle, with the *Scent* of a mixt between that and the *Urinous*: But being well putrefied, became sensibly *Urinous*.

8. The *distilled Liquor* of some *Herbs*, at the first *Rectification*, yieldeth a *Spirit* very hot; but the last inclined rather to that of pungent *Vinous Spirit* of *Scurvy-grass*, *Horse-radish*, &c. being, if I may say so speak, *Piperaceous*, and Biting, rather than like *Volatile Salts*; but after repeated *Rectifications*, one, two, or more, according to the Nature of the Plant, or Time it had *fermented*, became perfectly *Urinous*. This was usually, when the *Herbs* had not duly *fermented*; which proceeded, in my Apprehension, from some Commixture of *Essential Oil*, which by reiterated *Rectifications* is either separated or transmuted. The same happens in the *Vinous Spirits* of *fermented Vegetables*, and in their *fixed Salts*.

9. In the *Distillation* of the *putrefied Herbs*, the *Urinous Spirits* and *Salt* came chiefly at the latter end with the *Oil*, in the Form of a thick white Cloud or Fumes, and condensing in the *Recipient*, formed an innumerable Company of very irregular crooked Rivulets, exactly after the Manner of *Hartsborn*, *Blood*, &c. and at the Beginning came the *Phlegm*, with most of the *Acetum*, in great Drops with little Fume, and the Rivulets straight, and without *Stria* and Wandrings.

10. Some *Herbs*, as *Winter-Savory*, *Sage*, &c. in the first *Distillation* yielded copiously a *Volatile Salt* in a dry Form, which did coat the *Receiver*, and sublimed into the Neck of the *Retort*: So doth *Tobacco*; and once *Saffron* did so, in *Digestion* with *Spirit of Wine*.

11. All *Plants*, thus *fermented*, yielded plentifully (especially toward the latter end of the *Distillation*) a *Fætid* gross *Oil*, which, if the *Herb* was well *putrefied*, did not in the least resemble the Plant which produced it. I could hardly perceive that they differed from each other in either *Taste* or *Smell*: Only, if the Plant was not thoroughly *fermented*, an *Oil* would come over at the Beginning of the *Distillation*, which, as also the *Water*, would retain exactly the *Taste* and *Smell* of the *Vegetable* which afforded it; and it would be Fluid and Transparent, like other *Essential Oils*. The *Oil* of *Herbs* very well *putrefied* came over chiefly at last, and did require a very strong *Fire* to extricate it out of the *Herb*; was mostly, especially that which comes last of all, of the Colour and Consistence of *Tar*, very tenacious, and did far and wide emit a very odd, faint, *fætid*, offensive *Odour*. If any thing became infected by this *Oil*, it was not to be freed from it in a long time.

12. *Herbs*, which *distilled* in an *Alembic* with *Water*, yield little *Essential Oil*, as *Baum*, *Mint*, *Camomil*, &c. afford much of it thus *fermented*. And those that give much *Essential Oil*, as *Wormwood*, with many others, being *putrefied*, yield abundantly more.

13. During *Putrefaction*, the *Herbs* became exceedingly hot, especially those that were closely compressed, and had store of Moisture in them; so that I could as well detain my Hand in the Flame of an ordinary Fire, as in the midst of them.

14. *Fatty*, moist, and insipid *Herbs*, *ferment* much sooner, and with greater Heat, as *Grass*, *Dock*, *Garden Scurvy-grass*, *Celandine*, &c. Drier and

and much more rapid Plants, more leisurely, and with less Heat, as *Winter-Savory*, *Rosemary*, *Sage*, *Rue*, *Mint*. The *Stalks* of no *Herbs* ferment so soon as the *Leaves* freed from them. This is most evident in *Docks*, whose tender Parts are Pappy and Mucilaginous, when the *Stalks* are entire.

15. *Herbs* seem by this *Putrefaction* to be deprived of all their *specific* or peculiar Properties: *Celandine* looses its *Tinging Quality*; *Spurge*, its *Milk*, *vesicating* and *poisonous Nature*, &c.

16. *Herbs* which before *Putrefaction* were extremely *Fætid*, as *Arriplex Olida*, &c. became afterwards either *inodorous*, or not ill-scented: And, on the contrary, *Monk's Rhubarb*, *Garden Scurvy-grass*, with many other *inodorous Vegetables*, during *Putrefaction*, became abominably, and almost insupportably *Fætid*, like the worst of *Excrements*; all which yet they lost immediately upon *Distillation*.

17. None of these *Flowers*, I have hitherto used, do *stink* in *Fermentation*.

18. Many of the *Herbs*, thus *putrefied* or *fermented*, swarm with *Maggots*, (an Argument of the close and steadfast Contexture of the Seminal Principles in *Insects*) especially at the Bottom, and in the Middle, whither *Flies* and other *Insects* can have no Access to deposite their *Eggs*, and where the Heat is so violent, that they could not possibly subsist.

19. Yet the *Volatile Spirit* and *Salt* is not afforded by these *Insects*: For, having *distilled* separately a great Quantity of them, they yielded no *Volatile Salt* or *Spirit*, but a *Liquor* of a very different Nature.

20. *Herbs* fermented in a great *Glass* with a narrow *Neck*, the Mouth left open, in a few Weeks became, for the greater Part, a *Mucilage*; and *distilled* a Year after they had stood so open, yielded a little *Urinous Spirit*, but not a Drop of *Oil*.

21. *Vegetables*, if the external Air be excluded from them, will not *putrefy* or *ferment*.

22. Some *Herbs*, *Mosses*, and *Rudiments* of *Vegetation*, yield a *Volatile Salt*, *distilled* without previous *Fermentation*; as do also many *Seeds*, and several of them sufficiently *insipid*.

23. These *Volatile Spirits* and *Salts* have not only the same sensible Properties, but also agree in all known Effects and Operations with common *Urinous Spirits* and *Salts*; as, in the changing *Syrup* of *Violets*, and many other *Vegetable Tinctures* Green; in being *Diaphoretick*, *Diuretick*, and *Deobstruent*: Contrary to *Acids*, which they do *mortify*, *precipitate* all *Metals* and *Minerals* dissolved in *Acid Menstruums*; being highly *rectified*, and mix'd with perfectly *Dephlegmed Spirit* of *Wine*, strike the *Offa alba*, as *Chymists* speak: They unite with *Acids*, and thereby become *Armoniack*, or *neutral Salts*; and indeed perform whatsoever can be expected or desired from the common *Urinous Spirits* of *Salts*.

No Alcalizate Salt in any Sub-
ject before the
Action of Fire
upon it, by Dr.
Han. Cox. a.
1737. p. 159.

VIII. 1. The *Alcalizate* or *fixed Salts* of *Plants*, extracted out of their *Ashes* after *Incineration*, or out of *Tartar* calcined, do, in my Apprehension, neither *pre-exist* in the *Vegetables* that afforded them, before they were exposed to the *Action* of the *Fire*; nor do they *differ* considerably, (I am certain, not *sensibly*) from each other. The

The former part of this Position may be thus made out.

1. I never yet found, that any *Vegetable* (or indeed *Animal*, or *Mineral*) Substance did in the least measure manifest to the Taste, or by its Effects, that it contain'd any such Salt. Many *Plants* and *Roots*, lightly bruised, affect the Eyes and Nose after the manner of *Volatile Salts*, and several do bite the Tongue, and strike upon the Palate. Some *Herbs* yield a copious *Volatile Salt* immediately after they are pressed by a considerable degree of Heat: And many sorts of *Earths* do abound therewith; so that it is highly probable, they do often actually exist in *Vegetables*, in the very same form, wherein they appear to us upon *Distillation* from the *Herbs* themselves, or from *Soot*. And that *Acid Salts* do really exist in many *Plants*, is displayed by their Tastes and Effects. They may be also obtained without Fire or any Artificial *Analysis*, as is evident in *Tartar*, and the reputed *Essential Salts* of many *Plants*; in *Verjuice*, *Vinegar*, and *Verdegris*, whose *Acidities* may be concentrated, and made to appear in a dry form. Now did *Alcalies* exist in the *Plants* before the *Analysis*, especially so copiously as they sometimes appear afterwards, certainly they would betray themselves by some visible sensible Property, or other Symptom of their presence.

2. Did *Alcalies* præexist in *Plants*, probably *Animals*, whose sole Food they are, would also abound therewith; whereas, on the contrary, we do not find the least foot-steps thereof, either in *Blood*, *Urine*, *Bones*, *Horns*, &c. which do all abound with *Volatile Salts*: nor in some other parts, Excrements, and Juices, that afford store of *Acidity*, which may frequently by *Coagulation* be brought to a *Saline* form or consistence. Nor can it reasonably be pretended, that the *Ferment* of the Stomach and other parts, several Digestions and repeated Circulations, have alter'd its property, and at length render'd it *Volatile*; For, First, *Alcalies* seem to be of a very *Fixed* Nature, and are not easily *Volatilized*: And daily Experience will evince, that the Chyle doth not in the least participate, either in Taste, or any other Property, with *Alcalizate Salts*. Besides, *Herbs* taken out of the *Omasus* of *Ruminating* Animals, without any further Digestion or Preparation, yield a *Volatile Salt* as when *Fermented* or *Putrified* in the open Air, without Additament.

3. Most *Vegetables*, whether Woods or Herbs, if Burnt whilst they are Green, and with a smothering Fire, yield *Salts* which are far enough from *Alcalizate*; being either *Neutral* or *Acid*, or, to speak more properly, *Tartareous*: For they do almost exactly resemble *Putrified Tartar*; and *Distilled* yield the very same Substances. Indeed, some few Herbs, such as *Satureja*, *Rosemary*, &c. which abound with sprightly *Volatile Oyl*, if they are well Dry'd, upon simple *Incineration* yield an *Alcalizate Salt*: So do some Dry Woods. But that they are produced by the Fire, and not separated, I shall anon prove from Experiments, I think unquestionable and unanswerable.

4. In the most natural Method of *Analysing* *Plants*, which is by *Fermentation* or *Putrefaction* without Additaments, or the intervening of a suspicious *Analyser*, we receive *Oyl*, *Acid Spirit*, and *Volatile Salt* copiously; all

which did evidently præ-exist. But if the Herbs, are perfectly or intirely *Putrified*; little or no *Alkali* can be extracted from them; as neither from Rotten or *Putrified Wood*; the *Active Salts*, by whose *Combination* the *Alkali* is produced, being either Expired or Evaporated.

Next, I am to enquire, How the *Fire* produces this *Alkali*: Whether by the *Changing* of one single præ-existing Principle; or by enabling any among them to make so notable an Alteration upon or in the other? or lastly, Whether it is effected by the Union of two or more active Principles, which thereby become different from what they were before the said *Combination*?

I shall not at present trouble you with the Reasons, Experiments, and Observations, which have induc'd me to reject the former; but briefly suggest those, which incourage and dispose me to believe and Assent to the latter: So that this is my Position; That *Alkali Salts* do result from the *Combination* or *Union* of the *Saline* and *Sulphureous Principle*. But whether it is the *Volatile* or *Acid Salt*, which *Combines* with the *Oyl* or *Sulphur*, is now the Subject of our Inquiry. The ensuing Considerations seem to determine in favour of the *Acids*.

First, *Tartar*, which is sensibly *Acid*, and from which a *Volatile Salt* cannot be Separated by any commonly known method, by bare *Calcination*, becomes a strong and perfect *Alkali*. *Secondly*, *Nitre*, an undoubted *Acid* with a small proportion of *Mineral* or *Vegetable Sulphur*, is converted into a genuine fiery *Alkali*. *Thirdly*, *Nitre*, which is made by the Affusion of an *Acid Spirit* upon an *Alkali*, may be almost totally Distilled into an *Acid Spirit*, there appearing not the least Footsteps of a *Volatile Salt*, and scarce any of the *Alkali*, out of which it was chiefly produc'd.

But these are very weak and inconsiderable, compared with Arguments which necessitate me to believe, that it Emerges from the *Union* of the *Volatile Salt*, with the *Oleaginous* or *Sulphureous Principle*. For,

1. There seems to be a great Contrariety between *Acids* and *Alcalies*: Being mixt, they Heat, Fight, and Mortify each other; whatsoever one Dissolves, the other Precipitates: Whereas, were the *Salt* of *Alcalies* of a nature approaching to *Acids*, they would more plainly Unite without the violent Contention, which usually ensues.

2. *Alcalies* and *Volatile Salts* agree in most Properties, excepting their Different Degrees of *Gravitation*. They are both *Diuretical* and *De-obstruent*; they both Dissolve *Sulphureous Bodies*: Agree in their Contrariety to *Acids*, but Mix together Quietly without Noise, Heat, Ebullition, or impairing each others Vertues, and are easily Separable; the same in Quantity and Quality they were before Mixture.

3. *Tartareous* or *Essential Salts* of *Vegetables* cannot become *Alcalies*, until their *Acidity* be driven away; during which Operation, the *Volatile Salts* and *Oyl*, Uniting, become more Ponderous than the *Acid*, which before did Gravitate more than either of them in their separate state: So that such a Degree of *Fire*, as will wholly Dissipate the *Acid Spirit*, cannot Elevate the more Ponderous *Alkali*. Not but that, contrary to that which is commonly

commonly asserted, the most *Fix'd Alkali* may be Sublimed to a great height without Additaments, by an Intense degree of Heat: For, I have frequently reduced a *Pound* thereof unto 3 or 4 *Ounces*, and recovered a considerable Proportion which was caught in well contriv'd Vessels, some Yards above the Crucible, little, if at all, altered from what it was immediately before it suffered this *Violence*. Upon this Account chiefly it is that *Soot* yields some small Quantity of an *Alkali*, especially that nearest the *Focus*.

4. *Alcalies* may be divided into *Oyl* and *Volatile Salt* by facile and natural methods of Procedure. I my self have many times effected this in part: And a very worthy Person, in whom I can perfectly Confide, assured me, he hath frequently Resolved the whole Body of *Alcalies* into the two distinct Substances of *Volatile Salt* and *Oyl*; receiving of the latter a small Proportion: Which is also confirm'd by those Tryals I have made on the same Subject.

I could suggest many more Arguments and Experiments; but these being sufficient, and, I think, indissoluble, I proceed to confute the Pretensions of *Acid Salts* to an Interest in this new Production. First, What concerns *Tartar*, its *Acidity* is driven away in great quantity before it can become *Alcalizate*; and a *Volatile Salt* may, to my Knowledge, be by divers Methods Separated from it. Secondly, as to *Nitre*, though that in *Distillation* yields an *Acid Spirit*, yet it abounds also in *Volatile Salt*; as I could Demonstrate from the manner of its Generation, and from Irrefragable Experiments. And besides, perhaps in the Operation of the *Sulphur* on the *Acid Salt*, supposing it such, there is a Commintion of its parts, and thereby that made a *Volatile Salt* which was before *Acid*, only Magnitude discriminating between them.

2. I have asserted above, That *Alcalizate* or *Fixed Salts* extracted out of the *Ashes* of *Vegetables* do not differ from each other; as neither their *Vinous Spirits*; yet with this Restriction, if they were highly rectify'd or purify'd: And I may Add nor *Volatile Salts*, not only of *Vegetables*, but even those yielded by *Animals* or *Minerals*, with the before-mention'd Limitation of due Purification.

No sensible
Difference among the Fixed
and Volatile
Salts and Vinous
Spirits; by Dr.
Dan. Cox. *ibid.*
p. 154.

First then, I say, That *Salts* perfectly *Alcaliz'd* differ not from each other in Sensible, nor (so far as I have had Opportunity to enquire) in Hidden, properties. It hath been a constant and general perswasion, that many *Fixed Salts* do retain, some at least, the *Specific Properties* of those *Vegetables* out of whose *Ashes* they were extracted. The Salt of *Wormwood* and *Mint* are said to be Stomachical; that of the greater *Celandine* proper for *Ictricks*; those of *Broom*, *Ash-Keys*, *Elder*, *Bean-Stalks*, &c. Diuretical; of *Rosemary*, *Sage*, &c. Cephalick; and others, (too many now to enumerate,) which are thought to be endowed with very different Medicinal Properties. I am not very forward to Question and Quarrel with Opinions and Maxims establish'd by universal Consent, and confirm'd by the Experience of many Ages, unless I have sufficient Reason to distrust their Veracity and Validity. In the present Case, the perswasion of the

Vid. Sup.
Sect. VII. 6.

Ancients, and the Position which I shall endeavour to illustrate, though at the first Appearance they seem Diametrically opposite, may be easily reconciled. I formerly declared, That most *Vegetables*, Burnt whilst Green or Moist, and with a smothering Fire, yield a kind of *Neutral Salt*, which may be call'd *Tartareous*, and sometimes not improperly *Essential*, many of them retaining the *Vomitive*, *Purging*, *Sweating*, *Diuretical*, *Opiate*, or other general, and perhaps some Specifical, Properties, wherewith the *Plants* were Ennobled which produced them. Now, whether 'tis some small Quantity of *Essential Oyl*, which mixt with the *Saline* Principle renders it so variously Medicinal, the *Essential Oyls* of *Plants* being manifestly as 'twere a Compendium of the Plant, which they do equally exactly resemble in Smell, Taste, and other Qualities: Or, whether those Vertues are the Result of the *Crafsis*, and Mixture of the several Principles; certain I am, that after the *Oyl* is evaporated by an Intense Heat, or the *Crafsis* disturbed by Avolation of some Parts, and new Combinations of what remains, farewell all *Specifical* Qualities, and consequently all other *Differences*, than what Purity and Impurity, and several Degrees of Heat may occasion; some being more White and Fiery than others. Now some *Salts* are much more easily depriv'd of their *Acid* and *Oily* Parts than others; and in some, on the contrary, the *Oyl* is of so *Fixt* a Nature, or rather so closely combin'd with the other Principle, that it must be a very Intense Heat which can disjoyn them, and thereby reduce the *Salt* to the common Standard or Aggregate of Qualities, wherein all *Alcalies* agree.

The Industrious *Tachenius* does somewhere pretend to Demonstrate, that there is a real *Difference* between the *Alcalies* of Different *Plants*; which he would prove by the various Effects they have upon a Sublimate Dissolved in common Water. But this is easily Resolved by what I before suggested; as also by an easy obvious Experiment, which may at any Season in any *Plant* be readily Proved. Take what *Wood* or *Plant* you please, Burn it Green; the *Salt* being extracted out of the *Ashes*, will according to the different Degrees of Fire whereunto it shall successively be exposed, variously influence the *Mercurial* Solution, the several *Precipitates* differing no less from each other, than when made with the *Salts* of Different *Plants*.

This is also most evident in *Tartar*, which the less and more gently it is Calcin'd, the more *Salt* it yeilds; and, on the contrary, a much smaller Proportion, if suddenly and with the Highest Degrees of Heat. That which is prepared by the former Method, is Mild and Gentle; its Taste approaching somewhat towards that of *Acids*; whereas the other, which hath passed through the violence of Fire, hath not the least Affinity therewith, and can almost as little be Endured by the Tongue as a Live Coal of actual Fire. And there being very many Degrees of Heat, whereunto the *Tartar* may be successively exposed, according to the said Degrees, the manner of applying it, Space of Time, and Substances Employ'd in the *Calcination*; the Result will be Different, and produce different Effects: And the very same sort of *Tartar* will oftentimes become sensibly *Different* upon these Methods of Procedure, and produce most of the Appearances

Appearances mention'd by *Tachenius*. And sometimes several parcels of *Tartar*, which seem to our Taste and Eye *Calcined* to the same Degree, yet the Operations in Nice Experiments are frequently Various. And to me it doth not seem so very wonderful, that many Concretes do really *Differ*, which to the Senses appear Simple and Uniform; of which many Causes may be assigned. A great Number, and Variety of Instances might be here introduced to clear this Truth, if it were not already sufficiently known and believed.

But to proceed where I Digressed; What I have *Afferted* is Confirmed by the great *Variety*, which is most visible in *Pot-ashes*: Some being highly *Alcalizate* are very *Hot*; others *Cold*, *Watry*, *Nitrous* to the *Palate*, and no less weak in Effects than Taste; whereof *Soap-boilers*, *Dyers*, and other *Mechanicks*, are very sensible. All which proceeds from the Woods being, when they are *Burnt*, *Green* or *Dry*; from their abounding with *Oily*, *Aqueous* or *Acetous* Parts; as also from the several Degrees of *Heat* employed in their Production. Those who make *Glass*, and especially the finer Sorts thereof, complain that they cannot with the same Quantities and Proportions of Ingredients always produce the same Sort of *Glass*: Which they, not without Reason, ascribe to the *Differences* in their *Ashes*. This must necessarily often happen according to the lately mentioned *Hypothesis*.

That which hath been said of *Alcalizate Salts*, may likewise be Affirm'd concerning *Volatile Salts*, and *Vinous Spirits*: The former are afforded not only by *Vegetables* and *Animals*, but also by some *Minerals*: And although immediately upon their Production or *Extraction* out of the several Substances, which did yield them, they appear sensibly *Different* from each other, and are without dispute endow'd with very *Different* Properties, chiefly *Medicinal*; yet they may all by Slight Artifices be reduced into such a *Simplicity* and *Identity*, as that neither the most Acute and Faithful Senses, nor the most Rational and Nice Experiments, can find or make, without Additaments, the least Disagreement or *Discrimination*.

Volatile Salts abound in most *Vegetables*, from which they sometimes may be Extricated by simple *Distillation*; but usually previous *Fermentation* is required: Of which Operation I have formerly rendered a particular Account. This Salt may be obtained from *Soot*, *Urine*, the *Blood* of *Men* and other *Animals*; from *Bones*, and especially *Cranium's* or *Skulls* of *Men*; from many Sorts of *Horns*; (and indeed no Subject yields them so copiously, as those which are Annually cast by *Staggs* or other *Deer*;) from *Vipers* in great plenty; as also from divers other *Animals*. I need not here mention *Fartitious Salt Armoniaek*, that being a Commixture of several of the mention'd Substances with *Sea-Salt*. Also many *Minerals* and *Fossils* contain *Volatile Salt*; vast Quantities of *Salt Armoniaek* being found in many Parts of the *East*, which was probably *Sublimed* into those Caverns, whence it is extracted, by the Force of *Subterranean Fires*: Which Conjecture is sufficiently authorized by the same Substances being gathered near the *Crateres* or Mouths of our *European Vulcano's* of *Aetna*, *Hecla*, *Vesuvius*, in *Campis Phlagreis*; in *England* also near the Mouth of several *Coal-Mines*, which have been accidentally Fired: And of Recent Memory that Torrent of *Melted Minerals*,
which

n. 208. p. 169.

Vid. Sup. Sect. VII.

which boiled over the *Crucible*, (if I may so speak) upon the late *Conflagration* in *Sicily*, and poured itself into the adjacent Plains. This *Liquid Fire*, as it Cooled, Condensing, became Crusty at Top, and almost every where Stores of *Salts* were *Sublimed* or thrust forth by the Violence and Fury of the *Heat*. Some of these *Salts* resembled the vulgar *Sea-Salt*; others *Nitre*; some were of an *Aluminous* and *Vitriolick* Nature; but that which was most Copious and Universal, was *Armoniack*; which although much Discoloured, and render'd very Impure in most Places by its Union with Various *Metallick* and *Mineral* Particles, yet did chiefly as the *Fæctitious Salt Armoniack*, consist of *Marine* and *Volatile*, commonly called *Urinous Salts*, as did also the forementioned; as many Experiments have informed me, too Numerous and Tedious to be here inserted. Besides those *Mineral Substances* already mentioned, several Sorts of *Earth*, *Clays*, and *Marle*, which are fetch'd from the Superficial or Cortical Part of the Earth, do contain Store of *Volatile Salts*; which appear upon *Distillation*: And from some of them I my self have frequently Separated greater Quantities than will be easily Credited. It would require more Patience in the Reader than the Subject deserves, should I relate or particularly Enumerate the peculiar Sensible and Medicinal Properties, whereby the *Salts* are *Discriminated*, which the several forementioned Substances do afford. I shall therefore at present only Suggest, what in my Apprehension renders them so *Multi-fariously different* from each other; and then discover, how they may be reduced unto the same *Common Nature*, and, if you please, being *United*, become an *Uniform* and *Homogeneous* Substance; wherein I may Challenge the most severe Criticks and experienced Chymists, to find a greater Variety of Parts and Qualities, than what is absolutely necessary to constitute the *Essence* and *Definition* of a *Volatile Salt* in the *Abstract*.

It was long since by the Famous *Van Helmont* judiciously Observ'd, and by many Experiments Confirm'd, that variety of *Sulphurs* did chiefly *Discriminate* the Species of *Mixt Bodies*, and that most of the considerable *Changes* which were made in or upon them, were occasion'd by Separating their Own, or Superinducing an Extraneous *Sulphur*. If this be affirm'd of *Sulphur*, a pretended Simple Homogeneous Body, and the 2d Principle of the Chymists, it is deny'd: But if he intended, as is most probable, by *Sulphur* a Substance, which, when Separated, is usually Inflammable, and doth ordinarily appear in an *Oleaginous* Form, I esteem his Assertion very probable and Specious.

Let us make a short Reflection on the *Oyls* Extracted out of *Vegetables* by the Assistance of common Water, which are as 'twere a Compendium of the *Vegetables* that afforded them, being eminently and manifestly Ennobled with most of those Sensible and those more Hidden Qualities that did Discriminate the *Vegetables* whilst flourishing: Whereas their *Salts*, whether *Fixt* or *Volatile*, their *Waters* and *Earths*, can boast of little, which Discovers whence they proceeded, unless they retain some small Portion of their respective *Oyls*, whose Presence occasions those Slight Differences, which

which *Discriminate* them from each other; and being therefore depriv'd, they Relapse into their Elementary Simplicity. The same happens, as with *Fixed*, so in *Volatile Salts*, which are *Different* so long as they retain any mixture of those *Oyls* and *Sulphurs*, wherewith the Concrete that afforded them was Imbu'd; from which being freed, they all *Agree* in one common *Essence*.

Although I could confirm this Position by a great number and variety of Experiments, I shall for the present acquiesce in some easie and Obvious Operations, which will sufficiently manifest, that all *Volatile Salts*, being freed from Adhering *Oyls* and *Sulphurs*, become forthwith *Homogeneous* and *Uniform*.

Take any *Volatile Salt*, whether *Vegetable*, *Animal*, or *Mineral*, put it into a very tall *Glass-Body*, or *Bolt-head*; Sublime the *Salt* in *Ashes*, *B. M.* in a *Lamp-furnace*, or with other equal Temperate Heat, and the more Remiss the better. Repeat this Operation twice or thrice: Most of the *Oyl* remains at the bottom, or adheres to the Sides of the Vessel employed; and the *Salts* will not easily be *Distinguished* from each other, agreeing in Most, if not All, Manifest Qualities.

But because this Operation will not so well succeed, unless the Vessels be very conveniently shaped, and the Fire exactly Regulated by a judicious experienc'd Artist; for, either Skill or Due Care being wanting, some small Portion of the more Subtile fugitive *Oleaginous* or *Sulphureous* Particles will Ascend with, and infect the *Salts*, which are thereby still in some measure (if I may so speak) *Specified*: I shall briefly represent a more certain and facile method of Reducing them into one common Nature and Denomination. Pour upon the *Volatile Salt*, you would Purify, a convenient quantity of well Rectify'd Spirit of common *Sea-Salt*. When the *Salt* is Satiated, (which is discerned by the ceasing of the Heat, Ebullition or Commotion,) then with a Gentle equal Heat abstract the *Phlegm*, and with it some small quantity of *Volatile Salt*, which not being closely United, is upon the first Accession of Heat presently Dismiss'd. Sublime the remaining Dry Substance, which will become good *Armoniack Salt*. This being Pulverised, and mixed with equal parts of a pure and well Calcined *Alcalizate Salt*, or if you pour thereon a strong *Lixivium* or Solution of any perfect *Alkali*, the *Alcalizate Salt* combining more closely with the *Acid* than the *Volatile*, this latter will be Elevated by a small degree of Heat, and appears, either immediately or upon Rectification, in the Form of a Dry Subtile Fugitive *Salt*, perfectly free from the Contagion of *Oyls* or *Sulphurs*. And by this Common Method of procedure, All *Volatile Salts*, although the Tribes and Concretes that afforded them were exceeding Different and Distant, and they also *Disagree* in *Sensible*, and (as they are commonly styled) *Occult* Qualities, are brought unto a perfect Agreement in some few common Properties.

I might add, that whatsoever can be Effected by Artificial Operations, in order to the Unspecifying of *Volatile Salts* is more naturally and speedily performed by the *Air*, which is, as I could fully Demonstrate, Impregnated with a *Volatile Salt*, partly Sublimed by Subterraneous and Extracted by Celestial Fires; partly Expired from *Animals* during their Life; and both

both from *them* and *Vegetables* upon the Dissolution or Dissociation of their Constituent Parts in *Arefactions* and *Fermentations*. These *Salts*, being receiv'd into the vast Subtle Fluid *Expanse*, are immediately Divested of their *Discriminating* Properties, and become the Instruments of sundry remarkable Effects and Operations, not only in Natural, but also Artificial Productions: Which *Salt* may be obtained by sundry Methods, and out of several Substances, in its Pure *Simplicity*; but being once Dissolved in Rain, and Dews, and thereby insinuated into the Earth, or otherwise caught and convey'd into *Vegetables*, they are soon *Specified*, and by Union with the other Principles or Corpuicles of a different Nature, do Degenerate or are Exalted, which you please, and of *Simple* (at least comparatively) become *Compound* Substances; yet easily again Reducible, by Nature or Art, into their Primitive *Simplicity*.

It remains that I should detect the same *Identity* or Uniformity of Nature and Properties to reside in all *Highly Rectified Vinous Spirits*, which we have discovered in *Salts* both *Fixt* and *Volatile*.

That *Vinous Spirits* are only (or at least chiefly) the more Subtle Fine *Oyls* of *Vegetables*, by *Fermentation* broken into Lesser Particles, and less branched than those which constitute the *Oyls* themselves, will appear highly probable to him that shall duly consider the manner of their Production, and seems Demonstrable by divers obvious Experiments. For the same Quantity of *Vegetables*, which being *Distilled* with Water, no *Fermentation* preceding, yields *Oyl* plentifully, and little, if any, *Vinous Spirits*; being *Distilled* after a convenient time of Digestion, and the Addition of some proper *Ferment*, they afford store of *Vinous Spirits*; and if fully *Fermented*, there is little appearance of *Oyl*. Also the same *Herb*, *Fermented* after its *Oyl* is extricated by the usual Method, yields a far less proportion of *Vinous Spirits*, than when *Fermented* before it was Deprived of its *Oyl*. That portion of the *Oyl*, which is by *Fermentation* divided into lesser Particles, although notwithstanding this Comminution, they are (according to the *Cartesian Hypothesis*) branched enough to continue Inflammable, yet being Minute, do not affect the Palate after such different manners, or make upon it such a Variety of Impressions, as those that are occasioned by Impulses from the more gross *Oleaginous* Particles.

Now, if the Smaller and more Subtile Matter, which we shall henceforth call *Vinous Spirits*, being Pressed by Heat, carry up and convey along with them some entire unbroken *Oily* Parts, or receive them that are capable of being Elevated with the same Degree of Heat by which they were Rais'd; these Mixtures will retain somewhat of the most remarkable Differences in Taste, and sometimes Odour, whereby the *Vegetables* themselves or their *Oyls* were Discriminated: But upon long frequent Digestions, or reiterated Distillations, these gross *Oleaginous* Particles are either Subdivided, and thereby become *Vinous Spirits*, or that gentle equal Degree of Heat, which is sufficient to Elevate the more active *Volatile Vinous Spirits*, cannot Raise the more Sluggish *Oyls*; so that the Results are pure Single *Homogeneous Vinous Spirits*, which, whatsoever the *Concretes* were from whence they were derived,

rived, though vastly Differing from each other, as also their Oyls, out of which the *Vinous Spirits* were more immediately produc'd; yet the *Spirits* themselves thus Purified are in outward appearance Similar, and perhaps as perfectly Simple and Homogeneous, as most Substances in the Universe.

What I have deliver'd, is further confirmed by a more visible palpable Conversion of *Vegetable Oyls* into *Vinous Spirits*; which I have effected in many, and by Analogous Operations, I presume the same Change may be superinduced upon all. Pour upon an Ounce of some common *Vegetable Essential Oyl* 2 or 3 Pounds of *Vinous Spirits* perfectly Dephlegmed; (the greater Quantity the more speedy is the Transmutation or Change performed;) The Spirit will immediately, upon simple Agitation, Absorb, Devour, or Dissolve the Oyl, which by long Digestion or Reiterated Cohobations may be totally Divested of all those peculiar Properties it enjoyed whilst an Oyl, and become perfectly *Vinous*, never to be Separated in a distinct Form, or by any known Diacritical Sign or Artifice, to be Discriminated from what hath, in all appearance, Converted or Transmuted it into its own Nature, or at least into a Substance so like itself, as to deserve the same Denomination.

I shall here, instead of a Conclusion, impart unto you Two very odd surprising Experiments, which have some, though remote, relation, unto the preceding Discoveries concerning *Alcalizate* and *Volatile Salts*.

Having procured a great Quantity of *Fern-Ashes*, I Extracted their Salt after the common Method with *Water*; most of the *Water* being Evaporated, I obtained several Pounds of Salt, the greatest part whereof being Dried, I exposed the remainder unto the Air, that it might Arrest some of the Vapours fleeting in the same, and thereby become Fluid; which is commonly, though improperly, styl'd the Oyl per Deliquium. The rest of the Lixivium, which continued Fluid, being Filtred whilst warm, was of a very Red Colour, deeper than that of Florid Blood, or of most Clarets, and exceeding Ponderous. The Colour argued it abounding with Sulphureous or Oily Parts, and the Weight, that it was highly satiated with the Saline. Having put this strong Solution into a capacious Glass, I either forgot or neglected it five or six Weeks; and then looking after it, my Eyes were unexpectedly saluted with a most pleasant Spectacle, which having arrested, did immediately fix, detain and employ them in the Contemplation of an Object, which did at once most charmingly invite and fully requite their greatest Attention: The Lixivium had deposited a large Portion of the Salt it formerly contain'd, part of which Subsided, I suppose, immediately upon its Cooling: And several Weeks of very cold Weather insuing, did occasion the precipitation of more. So that, according to my Estimation, it was at least 2 Inches thick over the bottom of the Vessel. The lowest part of the Salt was of a Dark Colour, as if some Earth, Dirt, or Dregs, were admixt therewith. The upper part or surface contiguous to the Liquor was exceeding White; and there did arise or spring out of the whole Mass of Salt, at small distance from each other, several, I believe 40, Branches, which (abating the Colour) did most exactly resemble that sort of Fern which is single like Poly-pody, and not Branched, sending out several Leaves on each side from one

Stem. Their *Magnitudes* were divers, but the *Figures* of all were the same, without the least Variation; only some emitted more Leaves from the Stem than others; which is also usual in the *Natural Fern*. I preserved these *Artificial*, regenerated or resuscitated *Vegetables* many Weeks in the same Position, not moving them, they being of so tender a Fabrick, that the least Motion of the Glass did hazard their Disappearance.

Obs. 1. The *Fern* was of a middle Constitution between *green* and *dry* when Burnt.

2. It was employed to Dry Malt, burnt in a Kiln with a close smothering Heat.

3. Therefore the *Ashes* yielded a far greater Proportion of *Salt*, than when the *Herb* is very *Dry*, and *Incinerated* by a free open Fire.

4. From the same Causes the *Salt* was not perfectly *Alcalizate*, but plainly *Tartareous*, and abounded with *Oyl* and *Acid* Particles; and therefore might properly enough be call'd an *Essential Salt*: And upon *Fusion* with a strong Fire, was much chang'd from a *Dark Brown* becoming *White*, and was by the Action of the Fire much lessened in bulk, the consequence of the Avolation of *Oyl*, *Acidities*, and perhaps other Substances, during the Operation of so strong a Fire.

5. That part of the *Impure Salt*, which, as I before intimated, was Set to *Deliquate*, did not, as is usual, become *Liquid*, but a perfect Gelly, which could not by any Method be afterwards reduced unto its *Saline* Form: which recalls unto my Mind what is delivered by *Kircher* of his own personal Experience in the *Resuscitation* of *Plants*, who affirms, That at some certain time of the Operation, the prepared *Vegetable* Substances appear in such a form.

The other Experiment concerning *Volatile Salts* succeeded after this manner:

Having occasion for *Volatile Urinous Spirits* for some ordinary Uses, I mixt equal parts of *Sal Armoniack* and *Pot-Ashes*, which latter had a very strong *Sulphureous* Smell, yet did seem to abound with *Salt*, and that considerably *Alcalized*. The mixture being put into a Tall *Glass-body*, immediately upon its feeling the Heat, plenty of *Volatile Salt* Sublimed; from which I expected no unusual appearance, having often repeated this Operation without observing any Circumstance which deserved peculiar Attention. Being called from my *Laboratory* just as the *Salt* began to appear, at my Return I was amaz'd to see in the *Glass-head*, which was, as the *Cucurbit*, very Spacious, or Capacious, a *Forest in Perspective*, so admirably Delineated, as not to be excell'd, if imitated, by the Pencils of the greatest Masters in *Painting*. They were all, not only to my Apprehension, but also in the Opinion of several Spectators, ready to attest it, *Shadows*, *Rudiments*, *Adumbrations*, or *Representations* of *Firrs*, *Pines*, and another sort of *Tree* which I cannot easily Describe, nor have I ever seen it growing Wild or in Gardens, or in any Herbal exactly Represented. All these *Images*, although very numerous, were reducible to one of these three *Species*. I do not remember, that I have ever seen any more transportingly Agreeable

Agreeable Appearance in any Chymical Operation; although it is well known that *Chymistry* doth daily present those, who are very conversant with her, with a great Number and Variety of Objects, highly diverting for their Prettiness and Curiosity in *Colour*, *Figure*, and other Accidents.

But to return unto the foremention'd Operation. I am not ignorant, that *Volatile Salts* do constantly shoot into variously and beautifully Shaped *Chrystals*, but I could never observe them Regular, or Reducible unto a certain number of Figures; whereas in the Operation we have described, the Figures were *first* very different from any that ever appeared before or since upon *Distillation* of the Commixture, and *Distillation* of *Pot-ashes* and *Salt Armoniack*, although by me frequently Repeated; as neither upon the *Distillation* or *Rectification* of *Harts-Horn*, *Blood*, *Urine*, *Cranium Humanum*, *Salt Armoniack* with *Lime*, *Salt of Tartar*, and other *Alcalies*. Secondly, The Figures were all Reducible, in the Apprehension of every Spectator, unto *three* Kinds; two of them commonly known. But of this so Delicious a Spectacle, to my great Grief, I was soon deprived by the *Sublimation* of more *Salt*, which filling up the Interstices, did, together with the former, case the Glass, and retain'd no other Figure than the Concavity thereof allowed of.

The next Day, that great Virtuoso Sir *Rob. Murray*, (whose Memory can never be too much cherished, nor his Loss sufficiently bewailed,) honouring me with a Visit, I acquainted him with the lately recited Accident; who scrupled not, though a Rigid Philosopher, to credit my Relation, and to confirm me in the belief, that some certain Governing Principle might contribute towards the Production of this Phænomenon.

He affirm'd, That one *Davison*, a famous and experienced *Chymist* at *Paris*, had frequently shew'd him in a Glass a great Company of *Firrs* and *Pines*, which seem'd no less Lively and Accurate, than those produc'd by *Painters* are; but such Suspicions were soon stifled by their speedy Disappearance and easy Reproduction. He also referred me unto his Book of *Chymical Operations*, where I find he makes mention of it, as a great Artifice, as really it was, and makes it no less a Mystery by concealing the Process or Materials, whereby it may be effected; only that nothing was employed besides Substances afforded by the *Trees* which were Represented; and that the chief Ingredient was *Turpentine*. Herein his Operation differed from that which I lately recited; in that the Substance, out of which He rais'd those Shapes, was of a more Fixed Nature; that which afforded *Mine*, *Volatile* to the highest degree: He could constantly and regularly produce these Figures: But *Mine* did unexpectedly and Fortuitously represent themselves unto my View; neither do I ever again expect the like Appearance. Nor will I contend with him that shall affirm, it was a mere Phantasm, or a Fortuitous Coalition of *Salts* into such pretty Figures.

IX. 1. Burn any sort of *Herb*, *Flower*, *Fruit*, *Wood*, or whatever it be, and make *Ashes* thereof, with the *Ashes* and with pure *Water* in its natural Temper make the *Lye*, which after strain through moist Paper or a Filter,

Vegetable Salts
Extracted; by
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so that it becomes as Clear as possible. Afterwards put the *Lye* into a Glass Vessel, and let it remain in *Balneo Maria* until such time as a great part of it *Evaporates*, according to the Proportion observed by those that are used to such Operations, and according as the *Congelation* of the *Salt* is desired to be more or less Expedited or Retarded.

2. If you keep the *Lye* to *Evaporate* by the *Fire* in Vessels of *Earth* Glaz'd, you will lose a great Quantity of the *Salts*, for that as the *Lye* grows thicker, the *Salt* penetrates the Bottom and Sides of the Vessels of *Earth*, and is lost.

3. The Quantity of Water to make the *Lye* of is not determined; for the most part 5 lb. of *Water* will Extract all the *Salt* from 2 lb. of *Ashes*.

4. The *Ashes*, whereof we have already made the *Lye*, and by Consequence drawn out the *Salt*, may, if you *Burn* the same again in a Brick Furnace, make you afterwards another new *Lye*, which usually yields some small Portion of *Salt*.

5. The *Salts* drawn in the manner aforesaid, when the *Air* is Moist, use to *Melt*; to obviate this Inconvenience, when you burn the Materials to reduce them to *Ashes*, 'tis requisite to use with them a due Quantity of *Sulphur*: And if it happen the *Ashes* should be made to your Hand, you may mingle them with *Sulphur*, and keep the same to the *Fire* till such time as it be burnt. By this means the *Salt* will never come to *Run*, but become more *White* and *Chrystalline*.

6. There is no General Rule concerning the Quantity of *Sulphur* to be put into the Materials you thus *Burn*; you may nevertheless at a guess say, to 100 lb of Materials, 4 or 5 3 of *Sulphur* are usually sufficient.

7. All the *Salts* have a peculiar and Determined Figure, the which they always keep, although they are often Resolved into *Water*, and afterward Congealed.

8. If in one only Liquid you Dissolve together 2 or 3 sorts of *Salts* of Different Figure, when they Congeal they all assume their ancient and Proper Figure; and this not only happens in *Factitious*, but also in *Mineral Salts*. If in a Vessel full of *Water* you Dissolve equal or unequal Quantities of *Vitriol* of *Cyprus*, *Roch Alum*, and of Purified *Nitre*, this *Water* will be all of an *Azure Colour*: But when the *Water* is *Evaporated*, you will see in the Vessel, that the *Vitriol*, the *Alum* and the *Nitre* have re-assum'd distinctly their first Natural Figures, and that the *Vitriol* hath recovered its most compleat *Azure Colour*, leaving the *Nitre* and the *Alum* with their usual Transparent *Whiteness*.

9. Although it be said before, (N. 7.) That all *Salts* have a Proper and Particular Figure, yet notwithstanding all this, I have observed, That some manner of *Salts* have 2, 3 and 4 sorts of Figures. Two sorts have been seen in *Lettuce*, in the *Scorzoner's*, in the *Musk Melon*, the *Scopa*, in the Roots of *Efula*, in the *Black Hellebore*, in *Endive*, in *Eye-bright*, in *Wormwood*, in *Sorrel*, and in Shoots of *Vines*; Three sorts in *Black Pepper*, and in *Incarnat Roses*; Four sorts in the Roots of *White Hellebore*.

10. Besides

10. Besides the before mention'd *Diversity* of *Figures* which are found in *Salts*, I have observed, that among all *Salts*, of whatsoever *Figure*, there are found some *Cubical*; which, though they be never so often Dissolved and Congealed, appear still of a *Cubical Figure*, or inclining to it.

S. *Redi* knows not that it is a General Rule, That the different Parts of *Herbs*, *Fruits*, &c. make *Diversity* in the *Figure* of their *Salts*; but he says particularly, That the *Salts* of the *Leaves* of *Lawrel* Differ from that of the *Wood*, and that the *Figure* of the *Salt* of the *Pulp* of a *Gourd* differs from that of the *Rind*.

12. Many *Salts* of different Matter have the *same Figure*, or at least very like. The *Salt* of *Cucumber* hath a *Figure* like the *Salt* of *Eye-bright*, *Mechoacan*, *Scopa*, and *Lettuce*; also the *Salt* of *Orange-Flowers*, *Roses*, *Ginger*, *Endive*, *Colloquintida*, *Scorzonera-Root*, *White-Hellebore Roots* and *Liquorish*, are all like one another; *Coleworts* and *Rosemary flowers* give a *Salt* of one and the *same Figure*, as likewise do among themselves *Vine-Branches*, *Sorrel*, *Black-Pepper*, the *Rind* of *Pomegranates*, and the *Roots* of *Black-Hellebore*.

13. To make the *Bodies* of the *Salts*, when they Congeal, rest *Distinct* one from another (so as their *Figures* may be observed) and not to be Entangled and Heaped together, 'tis necessary, he says, that very great Diligence be used in Evaporating the *Lye*: For if that be wholly Evaporated, or if too great a part thereof, the *Salts* make a Confused Crust at the Bottom of the Vessel; if the *Lyes* are left too Weak, the *Salts* require a very long time to Congeal in; 'tis requisite therefore to use such a Diligence which is not to be gain'd without long Practice. The Instruments for measuring the *Weights* of *Liquids*, may give a Rule, which if it be not General, will at least come very near it. The *Lyes* being reduced to a convenient Thickness, are put into little small Glasses closed with a Stopple, and kept in a dry shady Place, and you must expect by the Benefit of Time, that the *Salts* will Congeal themselves into *Chrystalline Stones*, either in the Bottom or on the Sides of the Vessel.

14. Not all *Herbs*, nor *Flowers*, nor *Fruits*, nor *Woods*, when they are burnt, render equally the same Quantity of *Salt*, but according to the Diversity of their Species, the Quantity of *Salt* which is drawn from their *Ashes*, is found Different. The Seasons wherein the *Plants* are gathered make a great Diversity; as also does the Country, whether Mountainous, or Champaine, or Sea-Coast, or Marshy, or Moist.

15. All Matters Burnt give not the same Quantity of *Ashes*. But there is a great Diversity, which you may see by the following *Proofs*; the greatest part in the Year 1660.

<i>Vegetables.</i>	<i>Ashes.</i>					<i>Salts.</i>					<i>Asbes from 100 lb of Vegetables.</i>					<i>Sales from 1 lb of Asbes.</i>				
	<i>lb</i>	<i>lb</i>	<i>3</i>	<i>3</i>	<i>3</i>	<i>3</i>	<i>3</i>	<i>3</i>	<i>3</i>	<i>3</i>	<i>lb</i>	<i>3</i>	<i>3</i>	<i>3</i>	<i>gr.</i>	<i>3</i>	<i>3</i>	<i>3</i>	<i>gr.</i>	<i>gr.</i>
Dried Flowers of Oranges	100	4	6	0	0	5					4	6	0	0	0	0	1	0	8	
Gourds new gathered (which dry- ed in the Oven were 36 lb)	800	4	0	0	10	0					0	6	0	0	0	2	4	0	0	
Red Onions (being 720) Roasted, the Coals burned to 16 lb; to the Coals were added 4 3 of Sulphur	400	1	6	0	2	2	0				4	4	0	0	0	7	1	0		
Eyebright, fresh, and afterwards stilled and Burnt	150	5	0	0	4	0					3	4	0	0	0	1	1	1	9	
Distilled Roses	120	4	0	1							3	4	0	0	0	3	0	0	0	
Maidenhair	100	9	0	0	0	4					9	0	0	0	0	0	0	1	8	
Roots of Black Hellebore, which Dried came to 50 lb	150	6	0	0	1	0					4	0	0	0	0	0	0	4	0	
Roots of White Hellebore fresh, which dried came to 50 lb.	150	2	0	0	4	0					1	4	0	0	0	1	0	0	0	
Roots dried & burnt of fresh Esula	96	3	0	0	2	0					3	1	4	0	0					
Roots of Liquorish	30	2	0	0	1	4					6	8	0	0	0	0	6	0	0	
Pellitory	20	1	0	0	0	6					5	0	0	0	0	0	6	0	0	
Green Endive	100	2	0	0	2	0					2	0	0	0	0	1	0	0	0	
Green Bindweed	90	1	0	0	2	0					1	1	2	2	0	2	0	0	0	
Leaves of Lawrel	2000	33	0	4	0	0					1	2	0	0	0	0	3	1	22	
Leaves of Lawrel	500	6	0	0	10	0					1	7	4	2	10	1	5	1	6	
Water Melons well ripe, the Seeds being taken	1000	25	0	1	9	0					2	6	0	0	0	0	6	1	11	
Cucumbers	2400	18	0	0	0	0					0	9	0	0	0					
Wood of Ivy	300	9	0	0	0	0					3	0	0	0	0					
Scorzonera dried	50	8	0	0	0	0					16	0	0	0	0					
Pine Apples, the Nuts taken out	300	3	0	0	0	0					1	0	0	0	0					
Mugwort dried	150	8	0	0	0	0					5	4	0	0	0					
Leaves of Cyprus	130	6	0	0	0	0					4	7	3	5	0					
Peele of Pomegranates dried	10	1	8	0	0	0					6	8	0	0	0					
Sassafras	2	1	0	0	0	0					3	1	4	0	0					
Lignum Sanctum	12	2	6	0	0	0					20	10	0	0	0					
Yellow Sanders	4	1	1	4	0	0					1	0	4	0	0					
Black Pepper	4	1	2	4	0	0					5	2	4	0	0					
Ginger	30	1	7	0	0	0					5	3	2	2	0					
Turbith	12	1	0	0	0	0					8	4	0	0	0					
Wood of Fir		3	0	0	3	0											1	0	0	0
Scope		16	0	1	4	0											1	0	0	0
Scope		16	0	1	6	0											1	1	0	0
Wheat Flower											2	2	5	1	0					

Heads of Old Garlick 32 lb were Dried in a Furnace and Burnt ; from the *Ashes* there was hardly any Salt to be gathered.

Thirty Pounds of *Wheat Flower* burnt in a Furnace with a little *Sulphur*, and burnt a-new in a Potter's Oven, gave 8 $\frac{3}{4}$ of very black *Ashes*, the which being baked again for 8 Days continually in a Brick Furnace after the *Lye* was made, there could not be a Grain of Salt Drawn. The like happen'd in 10 $\frac{3}{4}$ of *Ashes* Drawn from a *Stare* and a half of Bran, burnt first in the Furnace with *Sulphur*, and afterwards baked in a Potter's Oven, and in one of Bricks.

16. All the *Salts* whatever Drawn from the *Ashes* of *Vegetables*, taken by the Mouth, says he, have a *Purging* Faculty, and a great measure more than what by some is believed in *Common Salt*, which taken by the Mouth has little or none at all ; or if it have any, betwixt that of *Common Salt* and *Vegetables*, the Proportion is but as *Two* to *Eight*.

17. This *Solutive* Faculty is of equal Energy in all the *Salts*, in such manner that the Salt of *Sumack*, *Peels* of *Pomegranates*, *Myrtle Berries*, or *Mastick*, *Purges* as much as the Salt of *Rhubarb*, *Sena*, *Turbith*, *Mechoacan*, and all other like *Purgative Drugs*.

18. The *Dose* to be used is the same in all the *Salts*, to wit, from 2 *Drachms* and a half to half an *Ounce* Dissolved in 6 *Ounces* of *Common Water* and *Broth* ; he has observed by infinite Experiments, that half an *Ounce* uses to *Purge* 3 lb and a half, or 4, or thereabouts, of Matter, more or less, according to the Complexions, and according to the Fulness of the Bodies.

19. In the *Purging* he has found no *Difference* betwixt these *Salts* that have sharp Points, and those that are Obtuse and Blunt or Cubical ; he has made proof very often in divers Persons, causing the like Cubical Stones of *Cucumbers*, *Ginger*, *Colewort*, and of *Liquorish*, to be picked out, and he has seen that they have Worked with the same Energy as the most Acute Hexagone Stones of the Salt of *Pepper*, of *Carnation Roses*, of *Mechoacan*, of *Coleworts*, of *Cucumbers*, &c.

20. From the aforesaid Observations, though you cannot Establish a certain Rule, you may nevertheless Conjecture, not without some Reason, First, that the *Salts* drawn from the *Ashes* of *Herbs*, *Flowers*, and of *Fruits*, &c. do not Conserve the Vertue, and that Faculty which Physicians believe the *Herbs*, *Flowers*, *Fruits*, &c. Endowed with ; Secondly, You may very near be certain of the Proportion of *Ashes* rising from each Species of *Vegetables*, and of the Quantity of Salt which is afterwards to be Drawn from them.

21. You may also observe that some *Vegetables* Insipid and Cold, as *Endive*, *Pompion*, and *Roses*, have given much more Salt than others of a stronger Savour, Aperitive, and Incisive, as the *Onions*, *Hellebore*, *Lawrel*, *Maiden-Hair* ; and *Garlick*, which is so strong, gives none at all ; But it may perchance be said, that in these there is a greater Quantity of Volatile Salt.

To find the Ex-
act Quantity of
Volatile acid
Salts contain'd in
Acid Spirits; by
M. Homberg. n.
262. p. 532.

Vid. Vol. I.
Cap. VI. Sect.
VI. 2. & S. VI.

X. M. Homberg, in a Discourse at a Meeting of the *Royal Academy* concerning the Quantity of *Volatile Acid Salts* contain'd in *Acid Liquors*, told us, That the *Acid Spirits* were no other thing but a *Salt* Dissolved by a little Water, which the Taste shews well enough for an *Acid*, as also its effects. He calls it *Volatile*, because it is Railed by the Fire with the *Phlegme*, and it cannot be but hardly Separated from that, and Reduced into a Dry form: That nevertheless M. Homberg has made in the Operation inserted in the *Memoirs* of the *R. Academy*, publish'd the 15th of Dec. 1692, by what Operation it appears that the *Acid Spirits* are nothing but *Volatile Salt* and *Phlegme*. The Quantity of Salt contain'd in a determin'd Quantity of *Acid Spirit* was not yet known, but he has given a way to know it, and also he may say the Quantity of Salt contain'd in whatever *Acid Spirit*, only by the Weight of Volume compared with the Weight of another Spirit, of which the Quantity of Salt contained in it was known; First, for knowing the Quantity of *Volatile Acid Salt* contained in some *Acid Spirits*, he has pour'd upon an Ounce of Salt of *Tartar* well dried, the Quantity of an *Acid Spirit*, as much as the Salt of *Tartar* has been able to take of it, then he Evaporated all the Insipid Humidity or *Phlegma* out of this Salt, and he Weighed the matter, the Quantity of his Weight above the Weight of the Salt of *Tartar* before Saturation is the Quantity of *Acid Volatile Salt* contained in the Quantity of *Acid Spirit* which has been taken by one Ounce of Salt of *Tartar*. Here is the Table of the Quantity of *Acid* that has been necessary to the perfect Impregnation and Fulness of the Salt of *Tartar*, and by the same means the Table of the Quantity of *Acid Volatile Salt*, contain'd in one Ounce of several *Acid Spirits*.

For the perfect Impregnation of one Ounce of Salt of *Tartar*, was poured upon it Spirit of *Nitre* 3j, 3ij, Gr. xxxj, the Weight of that Salt, after the Evaporation of the Insipid Humidity, has been Increased to 3ij, Gr. x, above one Ounce; that Increase coming from the *Acid* retained in the Salt of *Tartar*, shews to us that one Ounce of Spirit of *Nitre*, contains 3ij, Gr. xviii, of *Acid Salts*.

So for the Impregnation of 3j, of Salt of *Tartar*, has been poured upon it Spirit of Salt 3ij, 3v; the Increase after the Evaporation has been found 3ij, Gr. xiv; and therefore one Ounce of Spirit of Salt contains 3j, Gr. xv, of *Acid Salt*.

Upon 3j, of Salt of *Tartar* has been poured Oyl of *Vitriol* 3v. the Increase has been found 3ij, Gr. v; therefore 3j, of Oyl of *Vitriol* contains 3ij, Gr. lxv, of *Acid Salt*.

Upon 3j, of Salt of *Tartar* has been poured *Aquafortis* 3j, 3ij, Gr. xxx; the Increase has been found of 3ij, Gr. vj: therefore 3j, of *Aquafortis* contains 3ij, Gr. xxvj, of *Acid Salt*.

Upon 3j, of Salt of *Tartar* has been poured *Distilled Vinegar* 3xiiij; the Increase has been found of 3ij, Gr. xxxvj, therefore 3j, of *Distilled Vinegar* contains Gr. xviii, of *Acid Salt*.

It appears by this *Table*, that the *Quantity* of *Acid Salt* for Saturating the *Salt of Tartar* is near the same, though the *Quantity* of *Acid Liquors* should be very different, 'tis only the *Acid* of *Vinegar*, of which the *Salt of Tartar* retains more than it does of the others, that M. *Homberg* attributes to the Subtility of the Particles of the *Vegetable Acid*, which have been very much divided by the alterations in the *Fermentation* of the *Liquors* in the *Plants*, &c. of the *Wine*, and also in the *Distillation*, which Alterations the *Mineral Acid* has not received. The *Vegetable Acid* by that Subtility of Particles is able to Impregnate a greater *Quantity* of *Liquor*, than the same *Quantity* of *Mineral Acid*, and by that it is more easily raised up by the *Fire* than the others.

By these Observations, M. *Homberg* makes evident the reason of some Cases difficult to be explain'd without them: As 'tis well known one Ounce of *Aqua Regia*, compounded with the *Spirit* of *Nitre*, and the *Armoniack Salt*, Dissolves twice more *Gold* than one Ounce of the *Spirit* of *Salt* can do. The *Chymists* attribute that Effect to the Softness of the Points of one *Acid*, and to the Hardness of the other: When these Observations make Evident, that the *Spirit* of *Nitre* contains twice more of *Acid Salt* than the like *Volume* of *Spirit* of *Salt*, and open in the same time the true Cause of this Effect.

M. *Homberg* Discours'd also how we may know the *Quantity* of *Acid Salt* contain'd in an *Acid Spirit*; which he doth in the following manner: He takes an *Acid Spirit* (as *Spirit* of *Nitre*), he Weighs it by his *Areometer*, and at the same time he Weighs also *Distilled Water* (for the *Weight* of the *Phlegm* contain'd in the *Acid Spirits* is like as the *Weight* of the *Distilled Water*); then he looks for the *Bulk* of *Spirit* of *Nitre*, compar'd with a like *Bulk* of *Distilled Water*, which has given a certain *Quantity* of *Acid Salt* for each Ounce; and from thence he concludes, that the *Bulk* of the other *Spirit* of *Nitre*, of which the *Weight* is known, compared with the like *Bulk* of *Water*, shall give a Determined *Quantity* of *Acid Salt*, which will be Raised by the computations of the Relations of the *Weights* of those *Spirits*, with the *Weights* of the like *Bulks* of *Distilled Water*, by concluding from them and from the known *Product* of *Acid Salt* for the unknown *Product* of the same.

XI. I have received Accounts of 4 Sorts of *Falitious Shining Substances*, 1st, A *Falitious Paste* of Dr. *Baldwin*, shining in the dark like a *Glowing Coal*, after it hath been a while expos'd to the *Day* or *Candle-Light*. Another is the *Bononian Stone* Calcin'd, which Imbibes *Light* from the *Sun-Beams*, and so renders it again in the dark, whereas the former needs no shining *Sun*, but doth the effect in quite over-cast *Weather*, and even in a *Misty Day*. The 3^d, is by the *Germans* call'd *Phosphorus Smaragdinus*, said to be of this Nature, that it collects its *Light* not so much from the *Sun-Beams*, or the *Illuminated Air*, as from the *Fire* it self; seeing that, if some of it be laid on a *Silver* or *Copper-plate*, under which are put some live *Coals*, or a lighted *Taper*, it will presently *Shine*, and if the same Matter be shaped into *Letters*, one is able to read it. The 4th, is call'd *Phospho-*

Four sorts of
Falitious Shining
Substances;
by Mr. Olden-
burg. n. 135.
p. 867.

rus Fulgurans, which is a Matter made both in a Liquid and Dry Form: and not only shineth in the Dark, and communicates a sudden Light to such Bodies as 'tis rubbed upon, but being included in a Glass Vessel well closed, doth now and then *Fulminate*, and sometimes also raise it self as 'twere into waves of Light; Differing very much from the *Baldwinian Stone*, which is to be expos'd to some shining Body, as the *Day*, the *Sun*, the *Fire*, or some *Lighted Candle*, to receive Light from thence, whereas this *Fulgurating Substance* carries its Light always with it, and when put in a dark place, presently shews the same. Of which we have this further assurance given us, that a little portion of it having been kept 2 whole Years, hath not yet lost its power of *Shining*: So that 'tis believed, if a considerably big piece were prepared for it, it would serve for a *Perpetual*, or at least a very *long-lasting Light*.

The Bononian
Phosphore lost;
by n. 28.
p. 375.

XII. 1. Though several Persons have pretended to know the Art of Preparing and Calcining the *Bononian Stone*, for keeping a while the Light once Imbided; yet there hath been indeed but One, who had the true Secret of performing it. This was an *Ecclesiastick*, who is now dead, without having left that Skill of his to any one.

Statues of
the Bononian
Stone; n. 134.
p. 842.

2. S. *Malpighi* takes notice, That one S. *Zagonius* had a way of making out of the *Bononian Stone* Calcined, Statues and Pictures variously Shining in the Dark. But he adds (to our sorrow) that that Person lately Dy'd, without discovering to any Body his Method of Preparing it.

A Phosphorus,
by Mr. Robert
Boyle n. 196.
p. 583.

XIII. *Septemb.* 30, 1680, There was taken a considerable quantity of *Man's Urine*, (because the Liquor yields but a small Proportion of the desired Quintessence) and of this a good part at least had been for a pretty while Digested before it was used. Then this Liquor was *Distilled* with a Moderate Heat, till the *Spirituous* and *Saline* parts were Drawn off; after which, the Superfluous Moisture also was abstracted (or Evaporated away) till the remaining Substance was brought to the Consistence of a somewhat thick Syrup, or a thin Extract. This done, it was well Incorporated with thrice its weight of fine *White Sand*; and the mixture being put into a strong *Stone Retort*, to which a large *Receiver* (in good part fill'd with *Water*) was so joyn'd, that the Nose of the *Retort* did almost touch the *Water*. Then the two Vessels being carefully Luted together, a Naked Fire was gradually administered for 5 or 6 Hours, that all that was either *Phlegmatick* or *Volatile* might Come over first. When this was done, the Fire was Increased, and at length for 5 or 6 Hours made as Strong and Intense as the *Furnace* (which was not bad) was capable of giving; (which *Violence of Fire* is a Circumstance not to be Omitted in this Operation.) By this means there Came over good store of *White Fumes*, almost like those which appear in the *Distillation* of the *Oyl of Vitriol*; and when those *Fumes* were pass'd, and the *Receiver* grew clear, they were after a while succeeded by another sort, that seem'd in the *Receiver* to give a faint bluish *Light*, almost like that of little burning Matches dipt in *Sulphur*. And last of all; the *Fire* being

ing very *Vehement*, there pass'd over another Substance, that was judg'd more *Ponderous* than the former, because it fell through the *Water* to the bottom of the *Receiver*; whence being taken out, (and partly even while it stay'd there,) it appear'd by several Effects, and other *Phænomena*, to be such a kind of Substance as we desired and expected.

XIV. Dr. *Kunkelius* Prepares out of the *Condensed Light* (which by his Skill in *Chymistry* he knows to Extract out of any kind of Terrestrial Body whatsoever, as if it were there naturally placed) certain *Pills* about the bigness of *Pears* (to which he ascribes very strange Comforting and *Medicinal* Vertues) these being moisten'd a little, and in the *Dark* scrap'd with one's Nail, Knife or the like, do yield a very considerable *Light*, not without a conspicuous *Smok* also: Which afford a *Light* yet much more Pleasant and Strange, if about 8 or 10 of them be put into a Glass of *Water*, and therewith shook in the *Dark*, for thereby all the *Water* and the Cavity of the Glass will seem perfectly Filled with *Light*, Flashing by Turns very briskly; as I my self, not without the Admiration of the Spectators, have several times Experimented. The same Dr. *Kunkelius* hath also reduced the same *Lucid* Matter into the form of larger *Stones*, (which I have not yet had the good Fortune to see myself) which being *Warmed* by the *Hand*, but especially if they be a little Scraped, or Rubbed upon a Paper or Table, describe Letters very Legible in the *Dark*.

An Account of
Dr. Kunkelius's
Phosphores; by
Joh. Chr. Sturm-
ius. Ph. C. L.
n. 2. p. 9.

XV. 1. The *Liquid* and *Solid Phosphorus* do not materially Differ, being made both out of Substances taken from a Humane Body. The *Liquid* is a Substance mixed with a Liquor, that (though it would burn a Body when in a *Solid* Mass) will not Offend a Lady's Hand with Scalding, or even Heat, when Washed in it. An Experiment of this kind I made this last Week, in the Presence of several Persons of very great Quality, where a very Learned and Ingenious Person, Washing both his Hands and Face with it, made not only his own Face to Shine, but the Lustre of his Face discover'd 3 or 4 other Faces not far distant: yet so soon as the Candles were brought into the Room, the *Shining* disappeared, and no Sign or Change was perceivable on the Skin of either.

Experiments
with the Liquid
and Solid Phos-
phorus; by Dr.
Fred. Slare. ph.
Col. n. 3. p. 4.

This *Phosphorus* continues not its *Light* very long, if close stop'd: yet in one sort I have observed a kind of *Flashing* 6 or 7 times successively, though the Glass were closely stopp'd; which makes me to conclude it to be the same with the *Phosphorus Fulgurans* of Dr. *Elsholtz*, the *Flashings* of it having some resemblance to *Lightning*.

The other *Phosphorus*, which is *Solid*, Differs not, as I said, materially from the *Fluid*, being made for the most part out of *Urine*: but I am sufficiently satisfied that it may be as well made out of *Blood*, if it could as easily be obtained as *Urine* in great Quantities, since *Urine* is but the *Serum* of *Blood* strained through the *Kidneys*.

In this Preparation, we have not only the common *Analysis* into *Waters*, *Spirits*, *Volatile Salts*, *Sulphurs*, or *Oyls*, but divers other extraordinary Appearances before this Grand Product comes.

The Substance of this *Phosphorus* may be made as *Transparent* as any Resinous Body, and will *Melt* like Wax in warm Water: And when cold it is exceeding Tough, and cuts like *Luna Cornea*, or rather somewhat harder. When 'tis all under or covered with *Water*, it *Ceases* to *shine*; but whenever any part of it chanceth to Emerge or get into the *Air*, though the Glafs be Hermetically sealed or perfectly shut, yet it will *shine*.

In a large Glafs I have kept it without Water for several Days, and yet continually *Shining*, with little or no Diminution of its *Light* or *Weight*.

Of this *Solid* I have had some Parcels much more Vigorous and Inflamable than others. When I made some Experiments last Summer with this *Solid Phosphorus*, every one handled it without any Danger: But I have since had some Parcels that would scarce endure the Touch of a Warm Hand without taking *Fire* and *Burning*. Such Mischances have happened to several, that extorted this Curiosity out of my Hand, who would not believe such a Cold Body would of itself turn into so Fierce a *Fire*. Thus making some Experiments in the Company of a very worthy and ingenious Gentleman, I laid down a peice of this *Luminous* Substance (about 2 *Drachms* in Weight) and it took *Fire* when no Candle was in the Room, and we were all at a good distance, and it Blazed like a Faggot, and Burnt the Carpet and Board it lay upon. This Sort is only for the Experienced and Careful to meddle with.

The less Vigorous, as I was speaking of, did afford us this Experiment; We writ with a Pointed end, what Words we pleased in the *Light*, and then we removed into the *Dark*, and had very Radiant and Legible Characters, which looked like Words written with a Beam of *Light*: I have made this continue so for a considerable time, by laying it on with Advantage.

If we carry these Glorious Letters to the *Fire-side*, and suffer them there to grow Warm, they will presently turn into *Dark Lines*, and remain as long as good Ink may be thought to do.

This *Light* is very diffusive of itself, for I have marked down above a 100 Characters with this Illustrious Pencil, and found not a 20th part Consumed.

In like manner I weighed out half a *Grain*, and I spread it over my Hand at Night, which it gilded all over, and continu'd *Light* all the Night, for so I found it next Morning.

As a further Proof of its Diffusive Quality, having Weighed out one *Grain*, and counterpoised it in good Scales, it continued to *Flame* in the open Air for 7 or 8 Days, insomuch as shutting my Study Windows by Day, I could always see a Bead of *Fire*; and when I looked intent upon it, it sent up a *White Flame* into the Ambient Air; which a large piece does very remarkably.

After all was Burnt out, we had no *Ashes* or Recrements, save only a little Moisture which Tasted *Subacid*. Having suffered a larger piece to burn out, I had more Moisture, which Tasted like a weaker *Oleum Sulphuris per Campanam*. This puts me in mind, that most of my Friends, when they

they have seen this Experiment, are apt to call its Fume *Sulphureous*, and truly in all its Properties it seems rather referable to *Sulphur* than *Saline* Concretes, upon the Score of its *Inflammability*, as well as for this Reason, that it neither loses nor is Dissolved in *Water*.

What *Medical* Use may be made of this Noble Concrete, Time may discover. This I am sure, that the Learned *Willis* (were he alive) would rejoyce to see such a Product out of our Bodies, who was very confident of something Igneous, or Flammeous, or very Analogous to *Fire*, that did kindle and impregnate our *Blood*. Nor does the Ingenious Dr. *Lower* disallow such an *Hypothesis*, though he supposes an *Accension* of the *Blood* rather in the *Lungs* than in the *Heart*.

What Service this may do, in helping us to explain other *Phænomena* of Nature, I should be glad to know, particularly, as to that Observation of the Learned Dr. *Croon*, who, upon rubbing of his Body with a fresh and well-warmed Shift, has made both to *Shine*; and also that of a worthy *Bristol* Gentleman, who together with his Son told me, that after much Walking, both their Stockings will frequently *Shine*.

2. 1. In order to try the *Elasticity* of this *Shining* Substance when brought to a *Flame*, I made the following Experiment. I conveyed a Quantity of it into a small *Bubble* of *Glass*, as big as a Nutmeg (but blown very Thin in the Flame of a Lamp, that so it might be the more sensible of the *Elasticity* of the Substance Expanding into *Flame*) then I Hermetically Sealed up the End of the Stem of this *Glass* *Bubble*, so that no *Air*, nor any thing else, could pass out of the same, without breaking thereof. Then I approached the *Sealed Glass* to the Warmth of the *Fire*, and as I expected, soon found it kindle into a kind of *Flame*, and to continue so to do by Emitting *Flames*, and as it were filling up the whole Capacity of the *Glass* for some short time, after which it seem'd to be Extinguish'd without Breaking the *Glass* or so much as Cracking it.

Ph. Col. n. 4.
p. 84.

2. That I might be the better satisfied what this Matter so *Flaming* did resolve into, I made this following Experiment: I made another small *Bubble* with a pretty large Tube for the Neck, and left it open at the Top to be as a Chimney to the *Fire* below it in the *Ball*; then I made the Matter to *Flame* as before, by approaching it to the Heat, and found my Chimney as well as the upper part of the *Bubble* Lined with a yellowish *Sulphur*, which though thus *Sublimed* was not yet wholly divested of its *Shining* Property, but when a little Warm'd the whole *Bubble* would *Shine*.

3. To try at what rate it would *Burn* in the open Air, I made a piece of it *Flame* merely by approaching it to the Warmth of the *Fire*, and found it to *Burn* like a piece of *Nitre*, but without any *Explosion*, for it only *Flamed* away pretty nimbly.

4. I have further observed that it leaves a Red Tenacious Matter upon its going out, that looks not unlike to Red Wax, and is so *Sour* that it sets the Teeth on edge, and Dissolves Iron.

5. Exposing a large piece of it, that was carefully weighed, it continu'd a great while *Shining* before the *Light* was quite Extinct; and examining the Quantity

Quantity of the Liquor, that it Resolved into, I was not a little surprized when I found it *thrice* its first *Weight* at least. Some that Tasted of it call'd it *Spirit of Sulphur*, others *Spirit of Salt*.

6. I attempted to make Mr. *President's* Experiment, by the application of some *Wick*, to see if its *Light* and *Flame* could be more Concentrated and directed into one Body by some such application, either to the *Solid* or *Fluid* Matter, but I cannot as yet find any Expedient of doing it; for so soon as the *Solid* Matter kindles into an Actual *Fire*, it presently Consumes itself and the *Wick*; and the *Fluid* will not take *Fire* at all, though actually Heated, and so I could not drive it up the *Wick*; nor is the *Light* Vivid enough to do any great Service. However, I conceive the *Liquid* Form may be much more useful than the *Solid* for giving *Light*, because filling part of a large Spherical Glass of about 5 or 6 Inches Diameter with the *Fluid*, I found the whole Cavity of the Glass above the Liquor so filled with shining Steams, that I was able pretty well to Read a large Character thereby.

7. It being generally now agreed, That the *Fire* and *Flame* have their *Pabulum* out of the Air, I was willing to try this Matter in *vacuo*.

To effect this, I placed a considerable Lump of this Matter under a Glass, which I fix'd to an Engine for Exhausting the Air; then removing the Candles for some time, I carefully observ'd at what rate it Shined: When I was well satisfy'd what degree of *Light* there was, I presently drew the Sucker of the Engine ('twas one of Dr. *Papin's* make,) and found it grow *Lighter*, though a Charcoal that was well kindled would be quite Extinguish'd at the first draught; and upon the 3d and 4th draught, which very well Exhausted the Glass, it much increased its *Light*, and continued so to Shine with its Increased *Light*, till I was weary with observing it, when I readmitted the Air, and saw it again return to its former Dulness.

8. Indavouring to blow it up to a *Flame* with a pair of Bellows, I thought I had quite Blown it out, for it lay a good while Dead, before any *Light* appeared.

9. All Liquors are apt to Extinguish this *Light*, when the Matter is plunged into them, nor will it Shine or Burn though you boil it in the most Inflammable Liquors, though it be Oyl of Olives, Spirit of Turpentine, or even Spirit of Wine.

A Parallel between Lightning and a Phosphorus; by Dr. Fred. Slare. n. 150. p. 289.

3. 1. In order to the keeping my *Solid Phosphorus* from Consuming, I usually placed it at the bottom of a Glass of Water: Having several of these Glasses disposed upon a Table in view, whilst I lay upon my Bed, I could observe several *Flashes* of *Light* that successively pass through the Water, and made such bright and vigorous *Corruscations* in the Air, as would Surprize and Affrighten one not used to the Phenomenon. This Fiery Meteor passes something contracted through the Incumbent Water, but Expands itself much as soon as it gets above it. If you would make these Experiments to advantage, the Glass ought to be Deep and Cylindrical, and not above 3 quarters fill'd with Water.

If we compare these Appearances with *Lightning*, we may observe that *Lightning*, which comes at Intervals, passes uninterrupted thro' the most condens'd

condens'd Clouds, and is not Extinguish'd or Obstructed by the greatest Storms or Cataracts of Water, but like the Beams of the Sun, or any other Fire, freely passes through Glass and Water.

2. This Phosphorus in the mention'd State only Emits these Flashes of Light in Warm Weather, a certain Temper of the Air being necessary to produce the effect; for in the Winter, or Cold Weather, I never observed it.

The Warm Season of the Summer, is most productive of Lightning.

3. The mentioned Flash of Light is not apt to kindle or burn any combustible Matter, as I found by holding my Finger in it unmolested, but not trusting to that, I held in the Flame, Paper, Flax, and such Materials as are apt to take Fire, which it did no more than when we projected the Light of the Moon, by a Concave Glass upon the like Bodies.

Such an Inoffensive Flame that of Lightning is generally observed to be. But,

4. The matter of the Phosphorus, whilst in a more Condens'd Body, will easily be accended by the Warmth of the Air, or by the Immediate Beams of the Sun, and then will Burn very furiously, with such a Penetrating Fire as will not easily be extinguish'd.

Thus Lightning, when condens'd or contracted, and wrapt up in a Vehicle of Air, so that it does not so easily Diffuse it self through the yielding Aether, will then set Fire to Houses, Trees, &c. and do great Mischief.

5. Our Matter whilst Burning, acts the part of a Corrosive; and when it goes out, it Resolves into a Menstruum that Dissolves Gold, Iron, and other Metals.

Thus Lightning Melts down Gold, Iron, Lead, and other Metals.

These Experiments were concluded most Naturally to Illustrate and Resemble the Phenomena of Lightning, far exceeding either those made with Nitre, Gunpowder, or Aurum Fulminans.

XVI. Utinam Vir Illustris (D. Boyleus) de Natura Salium Experimenta sua ampliora edere dignaretur, quomodo Alcalia seu Lixivialia, utpote Fixa, ab aliis Acidis Austerisque, non minus fere Fixis, discrepent, & utraque à Volatilibus, aliisque Speciebus Salium, nondum satis explicatis, atque crassius nomineque distinctis. Nam inter Volatilia differre videmus Sal Urinosum à Sale quod inest Spiritui Vini, aliisque Inflammabilibus; quia Commixta Coagulantur, & novam Indolem acquirunt.

Magnam Spem habeo inveniendi Liquorem, qui Vesica injectus blande comminuat Calculos.

Nupur Serum ex Sanguine Brutorum examinavi, & calore leviusculo Coagulum vidi adinstar fere Albuminis Ovi; potissimum addito Acido indurabatur; sed ab admixto Spiritu Vini Serum tenebatur diu Liquidum, magis tamen ab Alcalibus.

Notavi Podagram & Arthritidem oriri, ubi Urinosa putrilago non separatur per Renes aut Sudores à Massa Sanguinea, sed cum ea distribuitur, & circa Juncturas in frigidioribus Ligamentis hæret, ubi propter Salis Acredinem Dolores Aciores (diffatiles tamen), vel propter Glutinositatem Tophos aut Rigores

Some Chymical and Medical Observations; by the Hcer Mich. Behm. n. 34 p. 69.

Boyle de Colorious & de Fluid. & Eism.

gores *Juncturarum* efficit. Utinam hujus Mali causas Sublimia *Anglorum* Ingenia penitius investigare, & Orbi communicare vellent, ne Incurabile amplius inter *Medicos* censeatur. Id ipsum me valde fecit Anxium, præsertim cum diligenter notarem, Nil prodesse *Purgantia*, Nil *Sanguinis* Missiones, parum *Sudores* & *Cauteria*, obesse *Emplastra Oleosa* & *Refrigerantia* omnia; quinimo, *Spiritus Vini* & *Salis Armoniaci* non Satis elicere aut discutere totam Materiam. *Thermas* valde salubres esse norunt cuncti, & ipse expertus sum, præsertim quæ *Urinam* provocant; sed quia non ubique suppetunt *Therma*, præbuit mihi Curiositas Liquorem, qui *Odore*, *Sapore*, Virtute satis exacte æmulatur *Thermas*; ista ratione membra ægra, reliquum vero Corpus simplici calida, balneando, levamen magnum sentio. Porro expertus sum, ausu proprio, insignem medelam per *Pilulas*, quæ *Urinam* promovent, *Sanguinem* depurant Fluidioremque reddunt, *Calculi*, Materiam atque *Scorbuticas* in *Mesenterio* visciditates referant, absque *Alvi* Turbatione. Verum per *Vesicatoria* (dissuadentibus licet Medicis) Dolenti Parti adhibita, Optimam, Promptam atque Tutam hætenus per aliquot Annos mihi & Amicis inveni Medelam; quamvis eam aliis, ad *Fistulosa Ulcera* pronis, non suaserim.

De Morbis, quos ex Effervescentia *Acidi Succo Pancreatici* cum *Bile* in *Duodeno* derivat Nobil. Dn. *Sylvius*, hætenus valde dubito. Nunquam enim *Succum* istum sensi Acidum; neque *Bilem* per *Acida*, sive *Mediocria* sive *Acrida* fuerint, Effervesce vidi, sed potius *Coagulari* in fundo, uti ab *Acidis* solet præcipitari *Lac Sulphuris*, aliaque *Oleosa*. Ideo per mixturam *Bilis* cum *Acido* Ciborum *Fermento* (quod certius apparet, quam *Succus* iste) *Chylum* utiliter temperari, cum *Helmontio* credo. Tot vero Morbos ex Mixtura tali, licet faceret Effervescentiam, oriri negat *Experientia*.

Chymical Experiments; by Dr. Fred. Slare. w. 159. p. 291.

XVII. 1. We took betwixt 10 and 20 gr. of the *Solid Phosphorus*, and caused it to Melt in as much Water as would just cover it, which was about a *Dram*: after it was actually Cold, we poured it into two *Ounces* of *Oyl of Vitriol*, which being well shaken together, did first Heat, and then throw up such *Fiery Balls*, which like so many Stars will adhere to the sides of the Glass, and continue to Burn for some time, and Shine not only in the Dark, but at Noon Day, in the Enlightned Air.

2. If you pour a small quantity of *Oyl of Turpentine* upon the foregoing Mixture it will take Fire, and Burn very furiously. This Experiment ought to be made in an open Vessel where the Air has a free access. This succeeded with *Oyl of Petroleum*, and *de Lateribus*: but *Sallet Oyl* and *Spirit of Wine* could not be made to Flame.

The Ingredients that compose this *Burning Mixture* are apart Cold to the Touch, and some of them in their Operations; thus *Water* and *Oyl of Vitriol* are Cooling in their Nature, but these in Conjunction cause a great Heat, which soon excites the Particles of our *Phosphorus* to an Actual Fire, and this Meeting with an *Inflammable* Ingredient, such as *Oyl of Turpentine*, or the like, does produce as considerable a Flame, as Boiling Oyls are wont to do.

3. According to the Directions of *Borrichius*, to make two Liquors *Kindle* AB H456
 ore another, tho' apart they are Actually Cold, we took 4 Ounces of fresh
 drawn Spirit of *Venice Turpentine* to 6 Ounces of *Aqua fortis* newly drawn and
 very strong. We mixed them together in a *Glass-Body*, and accordingly
 placed the Vessel in the Sun-beams (which I foretold some of the By-stand-
 ers would deceive us); after half an Hour's Patience, the Liquors began to
Ferment very furiously, insomuch that a very great *Smoak* was raised by this
 means, which was ordered to be kept down by a Cork that stop'd the Vessel.
 This condens'd *Red Fume* represented *Flame*, by reason of the Beams of
 the Sun that were permitted to shine upon it: But I was assured that this was
 a great Falacy, and that the Experiment contradicted the Proverb, There
 is no *Smoak* without some *Fire*. I was willing to give the Experiment any
 advantage, which made me comply with that Circumstance of doing it
 where the Beams of the Sun were admitted: But this very Circumstance
 giving ground to the Mistake, I desired leave to make the Experiment in a
 dark Room, where we should better discern any real Productions of *Light*;
 being assured that the *Action* of the *Liquors* would as certainly succeed in the
 Darkened Room as in a Light one. The Experiment was repeated, and the
Action of the *Liquors* was no less Vigorous than in the former Experiment.
 Moreover *Flax*, being look'd upon as a very Combustible Matter, was sus-
 pended in the *Fume*. But in short, the Observers of this Experiment, which
 were many and very inquisitive, could not discover the least Spark of *Fire* or
 Glimpse of *Light*, so that the *Flax* remained Untouched, and the *Fermenting*
Liquors gave no *Light*, *Fire*, or *Flame*: only take this Caution; keep your
 Candles at a distance, for the *Fume* will soon take *Fire* at any *Actual Flame*,
 and set the *Liquors* a *Burning*, and so it may impose upon the Careless.

4. Amongst those various Mixtures, wherein great *Heats* and *Effervescences*
 with much *Ebullition* were produced, none were so considerable as this;
 Upon an Ounce of Spirit of *Nitre*, if you pour 2 or 3 *Drachms* gradually of
 the *Highest Rectified Spirit of Wine*, the *Heat* and *Ebullition* will be incredibly
 great. And whereas in the former Experiment you must wait a good time
 for your *Efferescence*, here 'tis perform'd in an Instance; so that I had more
 reason to expect, from the mighty *Action* of these *Liquors* upon each other,
 a Production of *Actual Fire* or *Flame*, than from *Borrichius's* Experiment.

Possibly some may be ready to Imitate this Experiment, which may fail
 them, unless they observe some little Directions. Errors of this kind have
 made some People believe they are Imposed upon, when there is no such
 thing. *Common Spirit of Nitre*, such as was first Distilled into Water, and af-
 terwards *Dephlegmed* (or Distilled, so as to have all the Water separated)
 this will fail your Expectations; it must be the *Red Spirit of Nitre*, and a
 very *High Rectified Spirit of Wine*. In the next place, you must first pour
 into your Glass the *Spirit of Nitre*, which is the Heavier Liquor, and then
 the *Spirit of Wine* after; for if you invert the order, you will have no
Ebullition, which will not a little puzzle the Reason of Philosophers.

In this Experiment (especially if the Ingredients are made very *High*) the
Spirit of Nitre does as it were act the part of a *Coal of Fire*; as *Fire* Exhales
 Vol. III. and

and Drives up Water that is thrown upon it, so does this *Spirit of Nitre* very furiously throw up a great quantity of the *Vinous Spirit*, insomuch that it presently Perfumes a Room with the Smell. But to be more exact in this Observation, we Mixed equal parts together in a *Retort*, and then Cemented a *Receiver* of good Dimensions, and so we Condensed that Vapour which Rises from this Mixture, and obtained much of our *Spirit of Wine* again.

Both these Experiments may serve as Arguments against the Notion of *Acidum* and *Alkali*, since mighty Conflicts may be excited by Bodies of differing Textures where these two Principles are not Conspicuous. We have here indeed very strong *Acids*, but in the other never were any *Alkali's* suspected, whether *Volatile* or *Fixt*. Nor can I think that that Latent *Alkali*, imagined to be in the *Spirit of Nitre*, does produce this great Conflict; for I question whether there be any such thing; if it be an *Alkali*, it has quite lost its property, that 'tis not wrought upon by so strong an *Acid*, in whose Bosom it lies. Wood may as well remain Incombustible in a great Fire, as such an *Alkali* under the power of so great an *Acid*. But this is only a hint.

§. There are various *Liquors*, whose Mixtures are apt to produce greater or lesser *Effervescencies*, *Heats* and *Inflammations*, so that particularly the great *Incalescence* and *Burnings* in *Fevers* are easily accounted for, and made obvious by occurring Experiments. There seems more difficulty to account for some *Cold Disaffections* of the *Blood*, and other Juices of the Body. For *Hysterical Persons* will complain of a great *Chillness* or *Frost* in the *Blood*, during that *Paroxysm*, such as a good Fire and Warm Cordials will not easily conquer. In these Persons the *Pulse* is always very Tardy, (differing from what I have observed in *Agues*, where in the *Cold Fit*, it has been very Quick.) This may be better explicated, by a Solution of *Sal Armoniack*, than of *Nitre* in *Water*.

In about a *Pint* of *Water*, we dissolved about a *Quarter* of a *Pound* of *Sal Armoniack*, which was found to be so very Cold to the Touch, that we needed no *Weather-Glass* to convince us of the Effect.

In this Experiment we have no *Ebullition* or *Smelling* of the *Liquors*, but rather a *Condensation*, which may also happen in the *Hysterical Frigid Paroxysm*, for in case the Humours Swelled they would require more space, which perhaps is not to be allowed, but must then be Compensated by the *Acceleration* of the *Pulse*, which would then be obliged to transmit the Extended Humours in a shorter Time; but this is not our Case here, but refers to the next. I here chose to explain the *Affections* of the *Blood* by the Solution of *Sal Armoniack*, that (as we said in our Experiment) Affected the *Blood* of those Persons that long Touched it, with a sensible and troublesome degree of *Cold*. For the Mass of *Blood* may be very apt to degenerate into such *Concretions*, as do much resemble *Sal Armoniack*; and this will seem more probable if we consider, that *Human* and other *Blood* naturally abounds with *Urinous Salts*, and do preternaturally Degenerate into *Acrimonious* and *Pungent* Juices, which may be much promoted by a too liberal Use of high Seasoned or Salted Meat, and Sour Liquors. For this we find by Experience, that such an *Acid* as *Spirit of Salt* mixing with an *Urinous*, will be

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converted into *Sal Armoniack* (which has now lost much of its *Volatile Nature*.) This we may plainly Discern by its Shooting into a Figure, that resembles Feathers, which is proper to *Sal Armoniack*. That the *Blood* does abound with various Sorts of *Salts*, is not to be doubted; and that it has such a *Salt* as some call *Salsum*, which is *Sea-Salt*, I lately exhibited at the *Royal Society*; and lastly, that *Sal Armoniack* has its principal dependance on great Quantities of *Volatile Salt*, (such as the *Blood* is stored with,) and on this mentioned *Salt*, is very well known. So that having presupposed such Concretions as these to have their Existence in the *Blood*, we must consider how they come to Act. That there may be some Antecedent and other Concomitant Causes of *Hysterical Passions*, I do not deny; I only or principally consider the Cause of the *Cold Affections*.

'Tis very probable that the *Glands* do suffer great Obstructions, which are antecedent to this *Paroxysm*; I am the rather inclin'd to this Opinion, by reason of so great a *Thirst* as our Patients are apt to complain of before and in the Fit: by which Obstructions the usual Secretions of the *Lympha* are hindred as well from watering the Mouth, as the *Oesophagus* and *Stomach*, which causes *Thirst*. Moreover, the less Quantity of *Lympha* is Evacuated the usual Way, the more is absorbed by the *Veins*, which does so Dilute those *Salts* in the Mass of *Blood*, as brings them to a *Flux*, or such Solution as is necessary to give the *Cold Effect*. Thus *Sal Armoniack* will Mix with some Liquors, and not with others, scarce at all with *Spirit of Wine*, and not so well with *Wine* as *Water*, and the more Limpid the *Water* is, the better and sooner it Dissolves, and to this Menstruum does especially impart this *Cold Operation*. Which not unreasonable Conjecture of an extraordinary Effusion of *Lympha* into the Mass of *Blood* at such a time, is further Confirm'd by that great Quantity of *Urine*, those Persons are apt to make; which has made some fear a *Diabetes*, that have not been well versed in such Cases: For the *Urine* here will look very Pale and Limpid. And this may be further proved, that when the *Curicular Glands* are hinder'd from doing their *Transpiring Office*, particularly by any Cold Ambient Fluid, which happens to them that go into *Water*, that then they are obliged to throw off greater Quantities of *Urine*, which has been observed by me to be very Pale and Insipid, after a 2d or 3d Evacuation.

6. If we take any *Acid*, whether of *Vinegar*, *Verjuice*, *Wood-Sorrel*, *Oranges*, *Lemons*, or perhaps yet Milder ones, by casting into these Juices a *Volatile Salt* of *Humane Blood*, I always observed a notable *Ebullition* would ensue, which I never could find would *Heat*, as such Boiling Liquors are apt to do (and one would expect they should :) But on the contrary affected a good *Weather Glass*, so as to make the Liquor Descend, which was a manifest Token of *Cold*. There I found that the Higher the *Acid* was, the greater the *Ebullition*, and the *Cold* would be; which is very remarkable. For this reason I made use of very strong *Vinegar*, Dephlegmed by *Freezing* (which Way is taught by the Honourable Mr. Boyle, to whose great Favour and Manuduction I must ascribe whatever Service I shall be able to do *Experimental Philosophy*;) and by this Mixture we came much nearer the *Freezing Point*. But since it proves troublesome to prepare this *Vinegar*,

and because it can be done only at certain times, I have most commonly made the Experiment with *Spirit of Venus* or *Verdigrease*, which is the Highest *Vinegar* in the World; With this the *Cold* will be most Sensible to the Touch, and most conspicuous on the *Weather Glass*. For by this Mixture I have in the *Summer* made a *Weather Glass* to Descend below the Temperament of Cold Fountain-water, 6 Inches at least, which brought it so near the *Freezing Mark*, that it scarce wanted half an Inch. But at the same time the Liquor Swells, and takes up more room than before, and will not be contained in Shallow Vessels. In this Experiment we have some things very Rare, that a great and violent motion of two Dissenting Liquors should be so far from producing *Heat*, as to produce a notable degree of *Cold*, and that too with a considerable *Expansion* of their parts. Here we might Instance in an apposite, and as unexpected an Experiment, where an Effect contrary to our common Observation happens, and that is thus: If you Mix with Oyl of *Virriol* a quantity of *Water*, a great *Heat* will follow, without an *Expansion* of these Liquors, whereas *Heat* does constantly produce it in *Wine*, *Water*, and most *Fluid* and *Solid Bodies*: For here it rather *Shrinks* and *Condenses*, as you may see by making the Experiment in a Glass with a long Neck, and setting your Mark as soon as you make your Mixture. Both these Instances may a little puzzle the *Cartesian Hypothesis* to account for, tho' I am far from thinking they are able to destroy it. But to proceed with our Experiments, after I had sufficiently satisfy'd the worthy Spectators, that the produced degree of *Cold* was very considerable, I then poured in some few Drops of another Liquor, that soon altered the Temper of our *Cold Mixture*, and in two or three Minutes brought it to a warmth beyond that of the Ambient Air, though it was a very warm Sun shining Day, in *July*.

To apply the Experiment. In the *Cold Fit* of an *Ague*, we have often a Strong and Quick *Pulse*, which argues an *Ebullition*, (tho' I dare not call it an *Effervescence*) and Quick Motion of the *Blood*, and the *Pains* of the *Head* and other Parts, may be due to too great Distress or Extension of the Vessels, which depends on the *Expansion* of the Boiling Humours. In this Artificial, tho' *Cold Mixture*, we observe a mighty *Commotion* and High *Ebullition* and *Expansion* of the *Liquor*. In the *Blood* and other Juices of the Body, we constantly discover great Quantities of *Volatile Salts*, and sometimes either from an Infected Air, or bad Diet, and from several other Causes, *Sour Juices* may be derived to the *Blood*, which may so act upon those *Volatile Salts*, the *Blood* so much abounds with, as to give a notable Sense of *Cold*. It is no new thing for us to meet with Patients, that have thrown upon their *Stomach* and *Bowels* (which are the great *Emunctories* of the *Blood*) very *Sour Liquors*, such as when they happen to fall upon the *Teeth*, will Corrode those hard Parts. Thus in our Experiment 'tis plain, that a foreign *Acid*, meeting with a *Volatile Salt* drawn from the *Blood*, does produce a *Cold Effect*: and since we know no Liquors, but a Mixture of this kind, that gives such a *Cold Phenomenon*, it seems not unreasonable to believe that the *Cold Fit* of an *Ague* may be due to such a Mixture.

As to the *Incalescence*, made in our Mixture, I should have told you, that it was done by the bare addition of some Drops of Oyl of Sulphur per Campanam,

nam, being a Liquor that owes its origine to the *Fire*, I suppose it to have borrowed that *Calorifick* Quality thence, which made it represent the *Hot Fit*: For this I observed, that notwithstanding the Action of the *Cold Mixture*, it Grew more Thick and Slimy than 'twas at first, and that the addition of the mention'd *Oyl*, or *Spirit of Brimstone*, made it more clear and Fluid. Thus the Agile Spirits of the Humane Body, which tho' they cannot be thought to be Actual Fire, yet are suppos'd to be somewhat Analogous to it, being in more abundance pour'd into the Turpid Mass of *Blood*, do, by their Warmth and Action, first Attenuate those gross *Coagulums*, and then manifestly Subdue, and Reduce many of those Indisposed Particles to a good Texture, and Expel those that are disagreeable, by *Sweat* and *Urine*, or both ways; which is a good *Prognostick* of a Cure of that *Paroxysm*.

I shall only add this Objection made, *viz.* That there are no such *Acids*, of so High a Degree of *Acidity*, found in the Human Body, as we make our Experiments with. To which I may Answer, That there is no need also of so great a Degree of *Cold* to put our *Blood* into an *Ague*, a small declination from its usual Temperature, being sufficient to make us very Sensible.

7. A Member of the *R. Society*, having propos'd to try if the *Cortex Peruvianus* would not prevent this *Artificial Ague*, we made a strong *Infusion* of our *Bark* in common *Vinegar*, and then injected a Quantity of the mention'd *Volatile Salt*, a considerable *Commotion* of the Liquor ensued, with a Degree of *Cold*, but was not altogether so fierce as formerly; Moreover it abated much of Rising to the Height of the former Experiment, when *Opium* was mixed with the mention'd *Cortex*: tho' in this Case the *Acidity* was far from being quite Mortify'd. As to the *Cortex*, I do not intend in this Experiment to explain its Nature, which was only made to satisfy that Sagacious Gentleman's Curiosity: For I never thought that *Febrifuge* did Act the part of an *Alkali* in performing the Cure. But if I can make it appear that there are other Medicines that do pertain, or belong to the Family of *Alkalies*, which are Effectual in the Cure of *Agues*, this may serve to prove, that they do it by destroying some Morbid *Acidities* in the *Humours* or *Viscera*, and so prevent the usual *Commotions* such disagreeable Liquids are apt to make upon their Conventions. This is manifest, that *Coral* and *Crabs Eyes*, and other *Testaceous Bodies*, numbred amongst the *Fixt Alkalies*, and not only these, but those real *Fixt Salts*, as *Sal Absynthii*, *Cardui Benedicti*, &c. as well as the *Volatile Salts* in general, do Highly Correct and Change *Acid Humours*, where they can meet them; and not only so, but do hinder Liquors that are apt to Sour and Corrupt from Degenerating; (thus *Milk* and *Blood* it self may be preserved much longer; the first from growing Sour, the last from Fermenting and Putrifying, by a quantity of *Volatile Salt* or *Spirit* mixt with them;) which is in like manner granted to be true, that many *Agues* have been Cured by Medicines of this Nature; *Sal Absynthii* as well as *Volatile Salts* are used as the principal Ingredients in common *Febrifuges*. For a farther prosecution of this Experiment, we Dissolved as much *Chalk* as strong *Vinegar* was able to do, and then having strain'd it through a Filter, we pour'd it upon a Quantity of the Highly Rectify'd *Spirit of Blood*, but found neither *Ebullition*, or any Sensation of *Cold* or *Heat* to follow. XVIII.

XVIII. 1. *A Catalogue of those Oils that will take Fire, with a great Noise and Explosion, when the Compound Spirit of Nitre is poured upon any of them; and of those Oils that do only make a great Noise with Explosion, but will not take Fire; and also of those that do not make either Effervescence or Explosion. The First is marked with two Stars **. The Second with one *. The Last has no mark at all.* By Dr. Fred. Slare.

OILS	Vegetable	Essential	Perfect Stillations made by the Analysis of the Chymical Fires, where the Oleaginous Particles are truly separated from all other,	Garvi ** Cummin * Fennel * Dill *	Seeds.
				Juniper * Bay * Thyme * Wormwood * Angelica * Hysop * Lavender * Rosemary * Penny-Royal *	Berries.
			Light, or Aethereal, which are Specifically Lighter than Water and Brandy, and some than Spirit of Wine, and are usually drawn from the Seeds of Vegetables: Such as from,	Rue * Sage * Savin * Lemons * Oranges * Nutmegs * Cloves **	Tops of Plants.
			Ponderous or Heavy, which do commonly Sink in Water, being Distilled from the Heavy parts either of the Wood or Cortex of Trees. Such as from	Sassafras ** Guajacum ** Box ** Camphire ** Jamaica Pepper ** Cinnamon **	Fruits.
		Not Essential	Imperfect, made by Expression, which are Decomposed of several Parts of the Plants; as of	Almonds Olives Walnuts Lime Rape	Wood.
				Hartshorn ** Man's Skull ** Hoofs **	Cortex.
			Animal of Solid Parts _____	Humane Blood **	
			Fluid, _____	Amber or Succinum. Petroleum. Barbado's Torr. Bee's Wax.	
			Mineral of _____		

Spirit of Wine will give some flashes of Fire.

Balsam of Sulphur, a Compound Body made with Oil of Turpentine and Brimstone, if not too Thick, will Flame.

You have Twelve sorts of Oils that do make Ebullition, Explosion, and Flame; 12, Ebullition and Explosion without Flame; 4, that produce Neither; by the mixture of our Compound Spirit of Nitre,

2. Take

2. Take of any of the *Essential Oyls*, set down in the Catalogue, one part; of the *Compound Spirit of Nitre* two parts; (these may be *Drachms* if you please) and they will with great Celerity, and a great Noise, produce a *Flame*, which lasts a very little while, but leaves an *Insipid Caput Mortuum*, as Light and Tasteless as a Cobweb.

A Mixture of Two Cold Liquors producing an Actual Flame.
Ib. p. 201.

Note, 1. This Experiment should be made under a Chimney, or any convenient Draught, that so the Offensive Steams may Evaporate.

2. A Gally-pot spacious enough to hold 4 or 5 Ounces of Water, may be a convenient Vessel for this Experiment, if you only use the fore-mention'd Proportion; but if you please to use larger Quantities, then you must enlarge the Vessel.

3. You must put the *Oyl* into the Gally-pot first, and then pour the *Spirit* on the *Oyl*, because the *Spirit* being Heavier, does the better pass through the *Oyl*, and make a more expeditious Mixture. This must not be drop'd in gradually, but convey'd in all together.

4. Hold not your Head too near the Gally-pot, lest the sudden Explosion of the Matter should strike up some of it in your Face.

5. The *Compound Spirit* will lose much of its Vertue if kept too long.

3. Take of *Salt Peter* and *Oyl of Vitriol* equal parts, and Distil these out of a *Retort* in a good *Sand Furnace*, so that the Sand continue Red Hot for some Hours, for the Fire cannot be too great: The Fumes will rise of a very deep Red Colour, and will settle in the Receiver, in the Form of a Liquor, which must be carefully preserved from the Air; this being the *Spirit* with which all our Experiments were made, which are referred to in the Catalogue.

The Way of Preparing the Compound Spirit of Nitre. Ib. p. 202.

To make the common *Spirit of Nitre*, you need only to mix 5 or 6 times as much Clay as you take of *Nitre*, and Distil them in a *Retort*, and you may obtain a strong *Spirit of Nitre* this Way, especially if you *Dephlegm* it, and Rectify it to the best advantage.

With this we have made an Experiment of *Accension*, that succeeds sometimes, but with great uncertainty; but the first, which I call the *Compound Spirit of Nitre*, is only to be relied on.

This *Compound Spirit* seems to be the Active Principle, that stirs up the Oily, or more Passive Particles to take Fire; which will more easily be agreed to, if we consider that our *Compound Spirit of Nitre* does not only consist of all those *Igneous Particles*, to be found in *Common Spirit of Nitre*, but that it has also those *Igneous Particles*, which *Oyl of Vitriol* contains in it, crowded into our *Spirit of Nitre* made this Way.

For further Illustration, let us consider, that *Oyl of Vitriol* is a Creature of the Fire; That the *Sulphur*, which is plentiful in *Vitriol*, or in *Copperas*, is Accended; and afterwards Distilled over in the form of a Liquor, which is a Liquid sort of Fire, as having many Properties of it; if you put it to Water it will make it Boiling Hot; It Burns not only Linnen and Woollen, but Wood to a Coal; and scarce spares any thing.

Nitre, the other Ingredient of our *Spirit*, is very susceptible of Flame, which does also incorporate many *Igneous* and Corrosive Particles after it has

so

so many Hours lain Ignited in the *Fire*, comes over by *Diffillation*, very highly Impregnated with the same *Fiery* Particles; which is obvious to any one that has used to make Experiments with it. For *Nitre* itself has no Dissolving or Heating Quality, but is a great Cooler, and scarce can be reckoned amongst *Acids*; but after it comes out of the *Fire* in the form of a *Spirit*, it Tears in pieces almost all Metals, and brings them to a sort of Fusion, as *Actual Fire* does; it Dissolves Animals, and Vegetables, and Minerals; and has many Effects of *Fire*. Therefore from an Union of these two very *Fiery Spirits* results a much greater Quantity of *Igneous Matter*.

That *Fire* is very apt to Incorporate with Fluids, and even such as have had but a small Communication with it, an experiment, which I formerly exhibited at a *Meeting* of the *R. Society*, makes probable.

We took of *Spirit of Wine*, that was Highly *Rectify'd*, a Wine Glass half full, and placed a Tender Weather Glass or *Thermometer* in the Glass, and then put a Spoonful of Water to it, this immediately *Warmed* the Liquor, and made the *Weather Glass* Ascend two Inches at least: The Liquor in the *Weather Glass* subsided as the other Mixture grew Cold. I made it also Sensible to the Touch, by filling the Palm of the then *President's* Hand with *Spirit of Wine*, and putting a small Quantity of Cold Water into the same Hand, which made it sensibly Warm his Hand, as well as others that made the Tryal. But from this *Spirit*, which is too *Volatile* to indure much Communication with the *Fire*, you may expect only a Mild Tepid Heat. I am apt to believe, that there is scarce any thing which lies long in the *Fire*, but is apt to retain some *Igneous* Particles; which does appear to be so in all *Fixed Salts*, in *Quick Lime*, and more particularly in *Iron*. If you take a Bar of *Iron*, though of an 100 Years old, and *File* off about a Pound of it, and then you do Mix and Imbibe these *Filings* with a due Proportion of Water, enough to make the whole just moist; the *Fire*, which all this while lay concealed in the *Iron*, being more disposed to enter into the *Fluid*, does by these means Warm the Whole Mass. The *Iron* gained this Heating Quality by *Fusion* in those Fierce Fires which first separated the Metal from the Ore: For it is not in the Nature of the Ore before *Fusion*, to Emit any Heat, as I have found by mixing Water with it. There are a great many other Instances which make it very plain, that *Fire* will add both to the Bulk and Weight of Bodies; but these Affect Solid Bodies more manifestly. The Effect itself produced by our *Fluid*, does necessarily Prove the Inherent *Fiery* Particles to have caused the *Accension*.

And this leads us to consider the other part of our Matter, which in Conjunction with the Compound *Spirit* causes this *Accension* and *Explosion*.

But here it will not be amiss to premise a Distinction of Oyls into *Vegetable*, *Animal*, and *Mineral*; having made some Experiments with all these, but most of all with *Vegetable*; for which reason we Subdivide again the *Vegetable* into those made by *Expresson*, and those made by *Distillation*: And of those made by *Distillation*, we distinguish those that are made out of the Seeds from those that are made out of the *Trunks*, or *Cortex*, or *Roots*, or any other Part of the *Vegetable*. We further observe a Difference betwixt those

those *Seeds* that have only a Fragrant Smell and a Pungent Taft alone ; those that have both Odorous Emanations and a Brisk Taft together, and those that are Insipid and have no smart Taft.

In the first place we must set aside those *Oyls* made by *Expresson*. For having tryed *Oyl* of *Line Seeds*, of *Nuts*, of *Olives*, of *Almonds*, &c. we found these would not make *Explosion*, or *Ebullition*, or so much as any *Fermentation*, with our *Fiery Meteor*. Nor could I without much stirring bring them to Incorporate : And when they did Incorporate, the *Heat* was but just Sensible ; and the Reason may be, because this sort of *Oyl*, though it must be allowed to be a True *Pabulum Flammae*, for it may be made to *Flame* all away, yet it is not a True *Oyl*, although it must be allowed to have one Property of *Oyl*, that it mixes not with *Water* ; yet it doth not stand the Test of the *Fire*, for if you *Distil* it, you may part from it *Water*, and *Earth*, and *Soot*, and a true *Essential Oyl*, which afterward will bear repeated *Distillations* without any further *Dissolution*.

Having set by these *Vegetable*, but not *Essential Oyls*, we will briefly examine the *Mineral Oyls*, of which there are some, as *Oyl* of *Vitriol*, *Oyl* of *Sulphur per Campanam*, that have not any property of *Oyls*, but are rather *Acids*, and Corroding *Menstruums*. There are others which have the true Property of *Essential Oyls*, as *Oleum Petreoli*, and *Barbadoes Tar* highly Rectified, which do not produce any remarkable *Heat*, much less make an *Ebullition*, or *Explosion* : Nor does that Active *Oyl* of *Amber* do any thing more.

The *Spillatitious Oyl* of *Bees-Wax* had much the same Effect, when it was Incorporated with our *Compound Fiery Spirit* : And this inclines me to believe, that the *Wax* it self may be a Compound, more belonging to a *Mineral* than *Vegetable* Nature.

And now we will examine those *Essential Oyls*, which do Produce great *Ebullition*, *Explosion*, and *Flame*, with the *Compound Spirit*. Of these we have 2 sorts, *Vegetable* and *Animal*.

The True *Vegetable Essential Oyls*, do all of them make violent *Ebullition* and *Explosion*, and several do Actually take *Fire* and *Flame*, as the Catalogue of Experiments does Specify.

If it be enquired into, what share the *Oyl* has in Producing this *Fire*, whether only it be a *Pabulum*, or *Fuel*, for the *Spirit* to Actuate, and so be merely Passive ? Or whether it contributes any Particles that do help to excite this *Flame* ?

In order to Resolving this Doubt, we consider, That these *Essential Oyls* are produced from *Seeds* that have very Active or Warm Parts or Spirits, such as will easily Ferment and Heat, and having a Warming Influence upon our Tongues, and do give Heat to the Stomach and Blood of Animals. That the *Seed* is the System or Concentration of the whole *Plant*, and has *Spirit* or *Ferment* enough lodged in it to Assimilate all that Insipid Watry Element (which contributes Matter to its *Growth*) into its own Nature ; from hence the great quantities of *Essential Oyls* are produced. It's true, out of the *Trunks*, and *Roots*, and other Parts of *Trees*, we have *Essential Oyls*

Extracted, but with a vast Disparity, there being only a very small Quantity (in Proportion to what is in the *Seeds*) Floating up and down the other Parts of the *Vegetable*.

But I am not only to take notice of the Potential Warmth of the *Vegetable*, there being in my Opinion another Ingredient fit to be observed, which our *Essential Oyls* may be proved to contain, and that is a *Volatile Salt*, which gives much of that Pungency to the Taste. If we consider the Constituent Parts of these Active *Vegetables*, they much abound with *Salts*, which by a Moderate Fire are made *Volatile*, and by a violent Fire are *Fixt*. This seems to me more than probable by what I have found in a quantity of *Oyl of Cinnamon*, having had it in my own keeping for 20 Years; for about 10 or 12 Years it continu'd the same; but within these 6 latter Years it has Annually let fall some *Salt*, infomuch that it is now one half of it turn'd to *Salt*, and this without Addition or any Art used to Reduce it to this Form.

There is also Separated in *Distillation* of great quantities of *Vegetables*, as of *Thyme*, *Origan*, *Penny-Royal*, &c. a *Volatile Salt* of a peculiar Nature, (which our excellent Chymist Mr. *Molt*, first shewed me, and keeps quantities of it by him) this is very Clear, or ChrySTALLINE; in its *Specifick Gravity* a small matter Heavier than Water; and seems to be *Salt* and *Oyl* Coagulated into a Body: It will not Dissolve in Water, but easily Evaporates when Heated. I now consider these *Salts* as *Alkalies*, which all true *Volatile Salts* are, they do presently *Ferment*, and make great Collision with *Acids*, and therefore I am much inclined to make this Inference, That Our *Oyl* is not a bare *Pabulum Ignis*, or an Unactive Principle, but does upon a double account, as well upon the score of the Incalcescent *Oyl* as of the Inherent *Salt*, conspire with the Compound *Spirit* to make this great Heat; *Explosion* and *Accension*.

In the *Catalogue* of Experiments, we may further observe, That of the Light *Essential Oyls* drawn from *Seeds* of *Vegetables*, All of them do make a great *Ebullition* with an *Explosion*, but that few of them do actually take Fire; and that All of those that are drawn from *Trunks*, or other parts, of our *Vegetables*, do certainly take Fire and Flame. Wherefore having observed that those that do not take Fire, or Flame, did yet make as great an *Explosion* and *Ebullition*, and probably as great an Heat as those that did, I was apt to impute it to the Lightness, and too great Subtility and Volatility of those *Essential Oyls*, whose very Active Particles did too soon Exhale or Fly away. And this Conjecture is something justify'd by the Addition of a more Ramous Body, (which was *Balsam of Sulphur* made with *Oyl of Turpentine*) to our most *Volatile* or *Subtile Oyls*, which then produced a Flame, whose Particles being more Crass or Ramous, will detain the more *Volatile Oyl*, from too soon an *Explosion*, and give more time to the Fiery *Spirit* to Penetrate, and Mix it self with those Combustible Materials. And this may be one Reason why the *Ponderous Oyls* Distilled from the Roots, or Ligneous Parts of a Plant, do All take Fire; namely, because the parts of this sort of *Oyl* lying closer together, do not so soon dissipate after the *Spirit* is cast upon

upon it. And then as to the *Specific Gravity*, the difference is also very considerable, which any one may find by this familiar way: If you fill a Glass with one Ounce of the *Essential Oyl* of the *Seeds*, you will require 9 Drams of the *Ponderous Oyl* of the *Vegetable*, to fill up the same space.

This is also very obvious to any Spectator, that most of these *Oyls* thus Distilled, are more *Ponderous* than common Water, by their Sinking to the Bottom; whereas all our *Essential Oyls* drawn from the *Seedy Parts*, do Swim on Water, and some are Lighter than the best *Rectify'd Spirit of Wine*, but most are Lighter than *Brandy*, which has made our Chymists call them *Athereal Oyls*.

In the *Catalogue* of Experiments, you may find which are the *Ponderous Oyls*, that do constantly take Fire. Moreover, the *Ponderous Oyls* have yet one Advantage above the *Lighter Volatile Oyls*, they having been exposed to a longer and stronger Degree of Fire than the others, and so do Incorporate more *Igneous Particles* with themselves, which being put in Motion, may contribute something to cause this *Accension*.

The *Oyls* Distilled from *Animal Bodies* do All of them take Fire and Flame, but with this Difference, they do not make so great an *Explosion* as the *Vegetable* do, but do more Certainly take Fire, and will continue their Flame longer, but not so Fierce as the other. If we rightly examine the Constitution, or Texture of this *Oyl*, we have several Properties adapted to the Production of this Effect. You have a much greater Degree of Fire required in the *Distillation* of this *Oyl*, than is necessary for that of the *Vegetable*. You have also a great Quantity of *Volatile Salts*, (which are true *Alkalies*) that do pass over with your *Oyl*: And you have a *Ponderous Oyl*, that Sinks in Water; which being considered and weighed together, do make it Equitable to expect a more Constant *Accension* from the *Animal Oyls*, than from any other.

Oleum Succini, is justly put in the *Catalogue* of *Minerals*, and is produced by a strong Degree of Fire, (as is above mentioned) yet does it not make any Motion, and scarce any *Incalescence* with this *Oyl*, notwithstanding its abounding with *Volatile Salts*: The Reason is, because these *Salts* are not properly *Volatile*, as *Alkalies* are, but do belong to the Family of *Acids*, and so can make no Ferment with this *Compound Spirit*, which is itself highly *Acid*.

Having now made it plain and easy, for any one to make two Liquors, actually Cold, without any adventitious Heat or Fire, boyl up to Flame, it will seem strange that after so many Experiments made in the World by all sorts of Chymists, and with all manner of Fermenting and Fiery Ingredients, none should have discovered a Certain way of producing this Great and Desirable Effect. For though I will not question the Veracity of the great *Borrichius*, who declares to the World, that he made his *Oyl of Turpentine* and *Spirit of Nitre* to take Fire and Flame; yet for my part, after so many unsuccessful Experiments made with the greatest Accuracy I could, I must still own my Incapacity to perform it: But if you add some drops

Vid. Sup. Sect.
xvii.

of *Balsam of Sulphur*, to that *Oyl of Turpentine*, the Effect will then very Certainly succeed, and your Mixture advance to an Actual Flame.

Explosion and
Accension made
in Vacuo. 1b.
p. 212.

I shall venture here to add one surprizing Effect of this *Fiery Mixture*, which was done in the presence of several Spectators.

We took half a *Dram* of the *Oyl of Carvi-Seeds*, and poured it into a little Gally-Pot, and placed over it a Glass that held 3 Pints, upon Monsieur Papin's *Exhausting Engine*, and having soon Cleared it of the *Air*, we turned up the Vial in Order to see what Effect would ensue, in this sort of *Vacuum*, upon this Mixture: But in the twinkling of an Eye, the Receiver was Blown up, and the Mixture in a Flame; which Stupendious Phenomenon Surprized and Frightned us all. Nor did I ever see or hear of the like, by any Mixtures made in *Vacuo*, though I have my self seen a Thousand. For if we look into those many and admirable Experiments, made by the Immortal Mr. Boyle, the Removal of the *Air*, did almost always extinguish *Light*, and *Fire*, and *Flame*.

The *Blowing up* of the Glass does also make the Experiment the more Astonishing, and Puzzles one how to account for so great a quantity of *Air*, as was produced from these Liquors, which amounted only to a *Dram* and half; for here was required not only *Air* enough to fill up the Capacity of the Vessel, but also there was required so great a pressure within as did exceed that great incumbent Weight of the *Air*, that pressed upon this capacious Glass without, (whose Diameter was 6 Inches, and the Depth above 8); for otherways it would not have thrown it up into the *Air*.

If we Review and consider well the Phenomena of this Experiment, we may find the Resistance of some Hundred Weight that was countervailed; and not only so, but with a much Greater Force Exploded.

That it was not produced by an Expansion of the common *Air*, for that was seen to Rise out of the Liquors themselves, and was drawn out of them in their Separate State, by the *Exhausting Engine*, which suffers no *Elastical Air* to lie concealed in Liquors.

That it was produced in an Instant, by the mutual Collision and Agitation of these Active and self-expanding Liquors.

That it was not absolutely Generated *de Nova*, but that the *Air* was Antecedently there, we may reasonably believe, although in a very Differing State from what it is in, when in *Pleno*. For all that the *Exhausting Engine* does, is to deliver the *Air* from a State of Compression, by leaving it to stretch it self like a Bladder, that has full Liberty to swell up, and has no Hard Body to strengthen or oppose its Expansion: So that we have cause to conclude our Liquors to be furnished with this sort of *Air*, which being by the *Accension* of these two Liquors, put to a new and Violent Motion, do expand themselves, *de Nova*, and to that Degree, as to answer so great an Effect as is above mentioned.

5. The Circumstance of which Phenomenon will allow me to call this Mixture, a sort of *Liquid Gun-powder*, which brings me to make a Comparison betwixt *Gun-powder* and the *Fiery Mixture*.

These

These Phenomena Agree, in that both do *Heat*, and *Burn*, and *Flame*; and also do considerably Resist, and Raise up Bodies that do Oppose them. In both, the *Air* is much Agitated and Expanded: For in *Gun-powder* you have much *Air* Coil'd up and Included in Particles of *Nitre*, which the *Brimstone* and *Charcoal*, by their sudden *Accension*, do violently Expand and Swell to that Degree, that like a storm of Wind it bears every Heavy and Resisting Body before it, especially when it is Compressed, or Restrained within just bounds.

A Comparison
between Gun-
powder and this
Fiery Mixture.
p. 213.

The Experiment just above mentioned, can only Account for that *Explosion*, by charging it to some little concealed *Air*, our *Fiery Mixture* Expanded; insomuch that I doubt not, that if a way were invented, (which seems to me not impracticable) to make it go off, as *Powder* does out of a *Gun*, it would Project a Heavy Body a great way.

We further made an Experiment in *Pleno*, or after this manner.

We put a small Quantity of the *Oyl* in a Gally-pot, and some of the *Spirit* in an Open-Glass, and fixed a Plate of Copper upon the Gally-Pot, so as to cover it pretty exactly, and then set a Weight upon the Plate, and pulling a String, made the *Spirit* to Mix with the *Oyl*, which did at that Instant Blow up the Cover, and throw off the Weight.

But though it both in some respects agree with *Gun-powder*, yet in others you see a great Disparity: For *Gun-powder* will not be made to take *Fire*, or make any *Explosion* in *Vacuo*, both which this Mixture performed with the same Celerity it did in the *Air*.

Vid. P. 11.
Cap. 1. Sect.
LXXIX. 3.

Gun-powder is a Composition of the most Dry and Combustible Materials we can pack together; in our Mixture of two *Fluids*, one of them is not easily made to *Burn* by it self, and the other will Extinguish Common *Fire*.

Gun-powder requires Actual *Fire*, to bring it to an *Accension*, whereas in this you have only two Waters or Liquors, both Cold to the Touch, that do produce *Fire* and *Flame*, by the bare Joyning and Mixing them together.

And now we will conclude this Experiment, only taking Notice of the *Caput Mortuum*, (as *Chymists* call it,) or what remains after the *Accension* is over; which seems to be something uncommon.

In case you have adjusted the Proportion of *Spirit* to the *Oyls* exactly well, you will not fail to make the Mixture *Flame*: And upon the *Extinction* of the *Flame*, you will have a Light and Blackish Substance, which will indeed vary both as to the Bulk and Complexion, according to the Difference of the *Oyls*. But in this they all Agree, namely, to leave behind a Spungy and exceeding Light Matter, and perfectly *Inspid*. Sometimes it swells up into a great Protuberance, and big as a Man's Fist, above the Gally-Pot; and if you Taste it, (which you may safely do,) and Macerate it in your Mouth, you will find it to be as Tasteless as Paper, or even Paper when burnt to Ashes. Insomuch that we may safely conclude, that by this Powerful Mixture, a 3d Solid Body Results, absolutely differing from either of the two mentioned *Liquors*: And which makes it the more Remarkable, that both these *Fluids*, which have so great an Impression upon the Organs of

Smell,

Smell, and a very great one on the Organs of *Tast*, should in an Instant be Destroyed, and Terminate in a *Dry Insipid Caput Mortuum*, which will not Melt in the *Air*, nor be Dissolved by *Water*, nor other Corrosive *Menstruums*, but Remains as much a *Caput Mortuum*, as a piece of Paper, or a Rag Burnt to Ashes, if not much more.

Upon a Review of the whole, this Experiment will possibly not only Surprise and Amuse some, but Please and Delight others; and not only so, but perhaps afford some Instruction to a Philosophical Genius. By this the Power of *Motion*, in order to the Producing those great Effects of *Heat*, *Fire*, *Flame*, and *Light*, may be considered; the Natures of *Oyls* somewhat Examined and Distinguish'd; the Productions of new Bodies, by the Power of Mixture Represented; and I hope in time some Mechanical Use made of it, at least it's heartily wished so.

R. S. Vid. sup.
Sect. XVII.

Mr. *Molt*, a most Ingenious Chymist, and deservedly a Fellow of the *R. Society*, (to whom I must acknowledge an Obligation for the liberal use he allowed me of his great and excellent Collection of *Essential Oyls*) Affirms to me, that he hath sometimes made *Oyl of Turpentine* take *Fire*; But yet it proves so hard a matter to bring it to an *Accension*, that he is always doubtful of the Success.

I know that if a *Candle* be brought any thing near the *Smoke*, raised by this Mixture, then the *Oyl* will certainly take *Fire* from the *Flame* of the *Candle*. Not but that I am glad of this, or any Opportunity to do justice to the Memory of the Famous *Borrichius*, who has Printed an Experiment of this sort in the *Acta Hafniensia*.

Mr. *Molt* did also inform me, that *Spirit of Wine* would give a *Flash* of *Light*, with this Compound *Spirit*, but not *Burn*; and he has observed the same Circumstance in his Experiment, which I did formerly, (in the Year 1683,) That if you put your *Spirit of Wine* to that of *Nitre*, you will have a great *Effervescence* immediately ensue; but if you invert the Order, and put the *Spirit of Nitre* on the *Spirit of Wine*, you will not have any *Ebullition* for some time: But this Circumstance is quite contrary to all the other Experiments we have made about the *Oyls*.

That the *Spirit of Wine* does not take *Fire*, seems to proceed from the same Impediment, which hinders *Light Oyls* from coming up to an *Accension*, because they are so suddenly thrown off; and there seems to be a great Analogy betwixt *Aethereal Oyls*, and the *Spirit of Wine*, both as to *Specifick Gravity*, and as to all other Properties; *Spirit of Wine* seems to be a more Thin and Diluted *Essential Oyl*, that contains some *Water* and more *Air* in its Pores; they seem to own the same Material Cause: For if you Distil an *Essential Oyl* out of any *Seed*, you shall not then be able to Produce any *Spirit*, and, *Vice Versa*, if you Distil off the *Spirit* first, no *Oyl* will follow. There is also a great Affinity in Texture; for the *Spirit* and *Oyl* do easily Unite and Mix together, especially if the *Spirit* be highly *Rectify'd*, and have less of *Water* or other Heterogeneous Matter in it, as any one may find, if he will take the Pains to Shake a true *Essential Oyl* with *Spirit of Wine*, a good proportion of the former will Incorporate with the Latter.

XIX. I have found a *Sulphureous Spirit*, which being mixt with a *Volatile Alkali*, such as *Spirit of Sal Armoniack*, or *Urine*, &c. gave it a *Red Colour* in a Moment. I make the *Spirit* by *Distilling* 2 or 3 Pound of *Ben-zoin* with a little *Sand* in a *Retort*, *ad Siccitatem*, and put the *Oyl*, *Spirit* and *Flowers* altogether into a *Paper Filtre*, and the *Spirit* comes first thro'. You may put 2 parts of this *Spirit* to one of *Spirit of Sal Armoniack*, and shake the *Glass* or *Bottle*, and it will be *Red* in a Moment, though both the *Liquors* were clear before; and the more the *Glass* is shaken, the *Deeper* or *Blacker Red* it will be. It produces this Effect without any *Effer-vescence*: This Experiment may perhaps be serviceable in the demonstrating of *Sanguification*.

A Clear Sul-phureous Spirit, which being mixt with a Volatile Alkali gives a Red Colour; by Mr. Edw. Coles. n. 228. p. 542.

XX. To make the first of these *Liquors*, put a small Handful of *Dryed Red Roses* into a *Glass Bottle*, pour on them *Rectify'd Spirit of Wine* till it cover them an Inch. Let them *Infuse* in the Cold all together in the *Bottle* for 4 or 5 Hours, then *Pour off* the *Spirit of Wine*, which will be *Clear*, and have No Colour.

Two Clear In-flammable Li-quors, which be-ing Mixt give a Carnation Co-lour; by M. Geoffroy. n. 249. p. 43.

This *Second Liquor* is made by putting into some good *Spirit of Wine*, some Drops of good *Spirit of Vitriol*, or *Oyl of Sulphur*, so that scarce can the *Acid* or *Soure* be discover'd by the *Tongue*.

If you put a little of this *Last Liquor* into the *First*, it will give a *Fine Reddish Colour*, without any *Effervescence*, or other sensible Alteration.

If instead of this *Wine* mixed with *Acids*, you put to the *First* some Drops of any *Volatile Alkalies*, as of *Spirit of Sal Armoniack*, or other, it will give a *Green Colour* to the *Infusion*.

XXI. An Ingenious Teacher of *Mathematicks*, having occasion to make a Composition for a new *Fire-Engine*, whereof he was to shew his Majesty a Tryal, Mingled divers Ingredients in an Earthen Pot, over kindled Coals; but could not, or did not, do it so warily, but that the Matter took Fire, and began to Blaze furiously; which obliged him to stifle the Flame as hastily as he could: And having remov'd the Vessel from the Fire, and suffered it to grow Cold, when afterwards he came to look upon it, to see if what remain'd might be of any use to him, he was surpriz'd to find it Variously and Briskly Moved. Wherefore having set it aside, and to be sure that it might be thoroughly Cold, he after some Hours visited it again, and found it Move as before. And having cast store of Seeds upon it, to see if the *Liquor* would Move them also, the Bituminous part of it connected them into a kind of thick Scum, that covered most of the Superficies; but yet left some Intervals, in which the *Liquor* appear'd, and Discover'd that it continu'd its Motions. Two Days after, the Engineer discoursing with me of his *Fire-Work*, about which he had advis'd with me before; told me among other things, of this Odd Accident. And when I had ask'd him, if the *Motion* continu'd still, and had been answer'd affirmatively;

A strangely Selfmoving Li-quor; by Mr. Robert Boyle. n. 176. p. 1188.

tively ; my Diffidence or my Curiosity made me engage him to send for the Pot as it was ; partly to be sure of the Matter of Fact, and partly to try, if the knowledge I had of the Ingredients, which he had before told me, would afford any Hint of the Cause of so Odd an Effect ; a like to which in Kind, tho' not in Degree, I had many Years before Devis'd, and successfully Practis'd the way of Producing.

The Vessel being come, there did appear manifest Signs of such *Motion* as the Engineer had ascribed to it ; and therefore I caus'd it to be set aside in a *Laboratory*, where some *Furnaces* kept the Air constantly Warm, and did there and elsewhere, at distant times, look heedfully upon it, now and then displacing, or quite taking off some of the thick Scum, that too much covered the Surface of it ; and by this means I had the Opportunity to take notice of several Phenomena, whereof these are the chief.

1. I observed, that the *Motion* of this Liquor was not only Brisk, but very Various ; so that having loosened some small portions of the Scum from the rest, one of them would be carried towards the Right hand, for Instance, and another towards the Left, at the same time. 2. Where the Liquor came out first from under the Scum, it seem'd to move the most briskly, flowing almost like a Stream, whose *Motion* upwards had been checked, and as it were Reverberated, by that incumbent Obstacle. 3. Several *Motions* in this Liquor were the more easy to be observed ; because tho' it were Dark, yet it was not Uniform, consisting in part of *Oily* and *Bituminous* Ingredients, which though they seem'd to have but one common Superficies with the rest of the Liquor, yet by their Colours and Power of vigorously Reflecting the Light, they were easily enough Distinguishable from the rest. And I often observed, that some of the *Unctious* Portions of the matter, Emerging to the Surface of the Liquor, tho' perhaps at first one of them would not appear bigger than a Pin's head : Yet in the *Moving* forwards it would at the same time *Diffuse* it self Circularly, and make as it were a great *Halo*, adorned with the Colours of the *Rain-bow*, and so very Vivid, as afforded a very Pleasant, and at first Surprizing Spectacle ; these Phantasms often nimbly succeeded one another, and lasting till they lost themselves against, or under the thick Scum. 4. The *Motions* of this odd Liquor were not only various, but frequently *Vortical* ; to be satisfied of which, I sometimes put short bits of Straw, or Fragments of some such like Stuff, upon the Discovered part of the Surface of the Liquor, by which they were carried towards very distant, if not opposite parts of the Vessel at the same time. But to make the *Vortical Motion* more evident, I several times detached considerably large pieces of the thick Scum from the rest of the Body : And had the pleasure to see them *Move* both with a *Progressive Motion* in Crooked Lines, and with a *Motion* about their own Middlemost parts. All this while the Liquor, whose parts were thus briskly *Mov'd*, was actually *Cold* as to Sense. 5. To Observe what the Presence or Absence, of the *Free Air* would do to this Liquor ; I caus'd many Spoonfuls of it, with some of the Scum, to be put into a Cylindrical Glass, which, tho' large it self, had a neck belonging to it, that was but about the bigness of one's Thumb, that it might be well stop'd with a Cork.

But

But having by this means kept the *Fres Air* from having a full and immediate Contact with the whole Surface of the Mixture, as it had when that Mixture lay in the Wide-mouth'd Vessel; I could not perceive the Liquor to *Move* to and fro, no not though the Orifice of the Neck were left open; whereas having at the same time pour'd some of the Liquor into a very Shallow and Wide-mouth'd Vessel, call'd in the Shops, a clear cak'd Glass, it *Moved* rather more than less Nimble and Variouly than in the great Earthen Pot, (which yet was of the same Shape,) and shewed us many of those *Vivid and Self-dilating Circles*. 6. Tho' the *Motions* of the the Liquor did not seem to be always Equally Brisk, yet they appeared to continue Manifest and Various in some Diversities of *Weather*, as to *Cold* and *Heat*; and when I lookt on it by the Candle Light, as well as by Day Light.

I kept some Spoonfuls of this Liquor close stopt in a Vial, and by this means I had the Opportunity to observe, that when I pour'd out the Liquor into a Wide-mouth'd Vessel, it would *Move* as before, tho' this were done some *Weeks* after it had been put up. - About the beginning of *June*, that is, about five *Months*, or more, after the Liquor was first observed to *Move*, to Gratify the Curiosity of a *Foreign Minister*, and that of some other Ingenious Men then present, I caus'd the Vial to be brought, and having unstopt it, I pour'd out the Liquor in a conveniently shap'd Vessel; in which, after we had suffered it to rest a while, they were delightfully surprized to see it *Move*, (tho' not in my Opinion quite so Briskly as before, yet) very Manifestly and Variouly. This encouraged me to think it possible, that it might retain some *Motion*, tho' but Languid, 7 or 8 *Weeks* after; and therefore on the 25 of *July*, I looked upon it again; and having caused it to be pour'd into a China Cup, it Manifested at first a Brisk and Various *Motion*. But this after a while did so slacken, that I began to have some *Suspicion*, that the *Motion* it was put into by Effusion, and the first Contact of the Air, might have given it the greatest part of its Agitation; but this was only *Suspicion*.

XXII. *A Paper of less General Use Omitted, viz.*

A Factitious stony matter or Paste, *shining* in the *Dark* like a Glowing Coal, after it hath been a little while exposed to the *Day* or *Candle Light*; Invented by *Christ. Adolphus Balduinus*, and Presented by him to the *King*, and to the *Royal Society*. n. 131. p. 788.

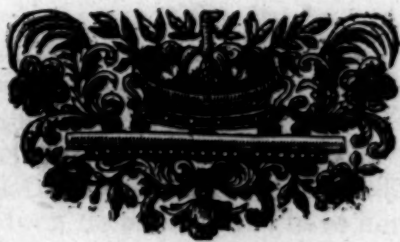
XXIII. *Accounts of Books, Omitted.*

1. **P** *Harmacologia*, seu Manuduſtio ad *Materiam Medicam*; in qua Medicamenta *Officinalia Simplicia*, hoc est *Mineralia, Vegetabilia, Animalia*, eorumque *Partes*, in *Medicina Officinis* usitata, in *Methodum naturalem Digesta* succinctè & accuratè *Describuntur*, cum *Notis Generum Characteristicis, Specierum Synonymis, Differentiis & viribus.* à *Sam. Dale.* n. 204. p. 925.
Vol. III. B b b 2. *Medicina*

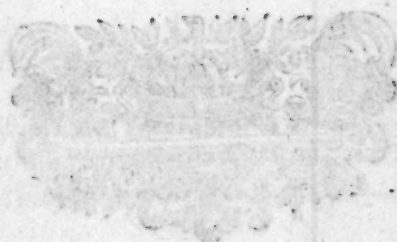
- n. 195. p. 489. 2. *Medicina Hydrostatica*, or *Hydrostaticks* applied to the *Materia Medica*; shewing how by the Weight that divers Bodies used in *Physick* have in Water, one may discover whether they be *Genuine* or *Adulterate*. By the Honourable *Rob. Boyle*. London. 1690. in 8vo.
- n. 76. p. 2287. 3. *Dan. Ludovici*, Medici Ducal. Saxo Gothani, de *Pharmacia Moderno Seculo applicanda*, *Dissertationes Tres*. Gotha. 1671. in 120.
- n. 60. p. 4087. 4. *Hermanni Grube*, M. D. *Commentarius de Modo Simplicium Medicamentorum Facultates Cognoscendi*. Hafn. 1669. in 8vo.
- n. 85. p. 5023. 5. A Rational way of Preparing *Animals*, *Vegetables*, and *Minerals*, for a *Physical Use*; by *Edw. Boilest*. Med. Reg. Ord. Lond. 1672. in 120.
- n. 75. p. 1176. 6. *Pharmacopœia Regia*, five *Dispensatorium Novum Locupletatum & Absolutum*, cum annexa *Mantissa Spagyrica*, & *Gemino Discursu Apologetico contra Ott. Tachenium*, & *Franc. Vernis*. Auth. *Joh. Zwelfer*, M. D. 1668. in Fol.
- n. 123. p. 709. 7. *Pharmacopœe Royale, Galenique & Chymique*, par *Moyse Charas*. à Paris. 1676. in 4to.
8. The *Royal Pharmacopœia, Galeno-Chymical*, according to the Practice of the most Eminent and Learned Physicians of *France*, and published with their several Approbations; By *Moses Charas*. In English.
- n. 133. p. 833. 9. *Pharmacopœia Collegii Regalis*. Lond. 1677. in Fol.
- n. 206. p. 1000. 10. *Pharmacopœia Bateana*; or, *Bates's Dispensatory*, Translated into English; by *Will. Salmon*. Lond. 1694. in 8vo.
- n. 264. p. 612. 11. *Pharmacopœia Harlemensis*, Senatus Autoritate munita. *Harlemi*. 1693. in 120.
- n. 52. p. 1058. 12. *Histoire Naturelle des Animaux, Plantes, & Mineraux*, qui entrent dans la Composition de la *Theriacque D'Andromachus*; par *M. Charas*. A Paris. in 120.
- n. 74. p. 2237. 13. *De Laudano Opiato*, Auth. *Matth. Tillingio*. M. D. *Frankfurti*. 1671. in 8vo.
- n. 99. p. 6166. 14. *Pharmaceutice Rationalis*, five *Diatriba de Medicamentorum Operationibus in Humano Corpore*; Auth. *Tho. Willis*. M. D. *Oxon*. 1673. in 4to.
- n. 39. p. 779. 15. *Olai Borrichii*, Med. Reg. de *Ortu & Progressu Chæmiæ* *Dissertatio*. Hafnia. 1668. in 120.
- n. 50. p. 1019. 16. *Otonis Tachenii Hippocrates Chymicus*. *Venetiis*. in 120.
- n. 135. p. 886. 17. A New Treatise of *Chymistry*, &c. Written in *French*, by *Christ. Glaser*: and now faithfully *Englished*, by *F. R. S.* Lond. 1677. in 8vo.
- n. 175. p. 1183. 18. A Course of *Chymistry*; by *Nich. Lemery*. M. D. Translated from the *French*, by *Walter Harris*. M. D. Lond. 1686.
- n. 175. p. 1186. 19. *Officina Chymica Londinensis*. Opera & Studio *Nicolai Staphorst*. Lond. 1685. in 120.
- n. 136. p. 920. 20. The Curious *Distillatory*, &c. Written Originally in *Latin*, by *Joh. Sigism. Elsholt*: and *Englished*, by *T. S. M. D.* Lond. 1677. in 120.
- n. 20. p. 555. 21. *Synopsis Nova Philosophiæ, & Medicinæ, Francisci Travagini*. Medici. *Veneti*.

22. *Hermetis Egyptiorum & Chemicorum Sapia, ab Hermannii Con-
ringii Animadversionibus vindicata, per Olaum Borrichium; Hafnia. 1674.*
in 4to.
23. *Davidis van der Beck, Mindani, Experimenta & Meditationes circa
Naturalium Rerum Principia, &c. Hamburgi. 1674. in 8vo.*
24. *Epistola ad D. Joëlem Langelotum, de Alkali & Acidi Insufficiëntia
ad gerendum Munus Principiorum Corporum Naturalium: Conscripta à
Joh. Bohn. M. D. Lipsia. 1675. in 8vo.*
25. *Zymologia Chymica, or a Philosophical Discourse of Fermentation,
from a new Hypothesis of Acidum and Sulphur; with an additional Dis-
course of the Sulphur Bath at Knarsbrough: by W. Sympson. M. D. Lond.
1675. in 8vo.*
26. *Philosophical Dialogues concerning the Principles of Natural Bo-
dies; by W. Sympson. M. D. Lond. 1677.*
27. *De Figuris Salium; by S. Redi.*
28. *Georgii Wedelii, M. D. Specimen Experimenti novi, de Sale Volatili
Plantarum. Francofurti. 1672. in 12o.*
29. *Traëtatus 5 Physico-Medici de Sale-Nitro & Spiritu Nitro-Aereo, &c.
Auth. Joh. Mayow. L. L. D. Oxon. 1674. in 8vo.*
30. *Jac. Barneri, D. Spiritus Vini sine Acido, &c. Demonstratio Curiosa.*
31. *The Chymical Touchstone of M. Joh. Kunkle. De Acido & Urinoso Sale
Calido & Frigido, contra Doctor. Voights Spir. Vini. Vindicatum. Berlin.
1684.*
32. *Traëtatus de Salis Cathartici Amari in Aquis Ebeshamensibus & hujus-
modi aliis contenti Naturâ & Ufu. Auth. Neh. Grew. M. D. Lond. 1695.
in 12o.*
33. *Il Fosforo, ovvero la Pietra Bolognese Preparata per reluere fra l'om-
bre Fatica di Marc. Antonio Cellio. In Roma. 1680.*
34. *Differtatione Epistolare del Fosforo Minerale osia della Pietra Illumina-
bile Bolognese, à Sapienti ed Erudity Signori Collettori degli Acta Eruditorum
di Lipsia, Scritta da Luigi Ferdinando Conte Marsigli, &c. Lips. 1698. in 4to.*

The End of the First Part.



The End of the Long Tour.





THE
 Philological and Miscellaneous Papers,
 PUBLISH'D and DISPERS'D
 IN THE
 Philosophical Transactions
 AND
 COLLECTIONS
 ABRIDG'D,
 AND
 Dispos'd under GENERAL HEADS.

CHAP. I.
 PHILOLOGY.
 Grammar.

I.  Having observ'd a great Difficulty in truly *writing* what is Pronounced, or truly *Pronouncing* what is Written, either in Our own or Foreign Languages, by the ordinary *Alphabets* now in use, arising either from the Want of some Letters, or the Differing Pronunciation of the same Characters or Letters in differing Languages, and the Irregularities of its various Sounds in any one Language, I saw a Necessity of some such Expedient as I have here attempted, *viz.* An *Universal Alphabet*, which should contain an Enumeration of all such Single Sounds.

An Essay towards an Universal Alphabet by Mr. Lodwick. n. 182. p. 126.

Sounds or Letters as are used in any Language. By the help of such a Collection being perfect, 1. Children from their first beginning, being Taught and Accustomed to the true Expression of all these single Sounds or Letters, will without difficulty be brought to Pronounce truly and readily any Language. 2. Any one Accustomed to the true Pronunciation of this Alphabet, will be enabled to Describe the Pronunciation of any Language whatever, that shall in his Hearing be distinctly Pronounced; so as another also Accustomed to this Alphabet, altho' he before never had Heard this Language Pronounced, shall notwithstanding at first Sight of such Writing, be able so truly to Pronounce it, that it shall (if at all) very little Differ from the Original Pronunciation. 3. This Alphabet will also be useful to Perpetuate the true Sounds of any Language, and serve as a Standard thereof to after-Ages: For if all the Single Sounds expressible be here Characteriz'd; and that no One Character have more than One Sound, nor any one Sound be Expressed by more than one Character; it cannot fall out that any Character should be Falsly Pronounced, but it will soon be Discover'd; for this False Sound he giveth it, must be the True Sound of some other Letter of this Alphabet.

In this Collection I proceed according to these Rules. 1. That no True Single Sound can be truly Describ'd, or express'd by the Conjunction of any Two or more other Single Sounds; Viz. If a Vowel, by the Conjunction of other Single Vowels; or if a Consonant, by the Conjunction of other Single Consonants.

2. That whatever Sound cannot be Express'd or Describ'd, but by the Conjunction of two or more Single Sounds, is no Single, but a Compound Sound.

3. That in every Composition of Single Sounds, the particular Single Sounds which make up that Composition, ought to be Truly and clearly Discern'd in the Sound of the Composition, otherwise it cannot truly be said to be a Composition, and Composed of such Single Sounds.

The Single Sounds, usually nam'd Letters, are commonly Distinguish'd into Vowels and Consonants. Vowels are such as are Singly expressible, as a, e, i, o, &c. Consonants are such as cannot Singly be express'd without the Conjunction of a Vowel, as b, d, f, g, &c.

The whole Number of Vowels are these 14 following; to which, for the better discerning of their Sounds, I have annexed so many Words wherein they are Express'd, all English but 3, viz. 7, 8, 12; because no English Words occurred to my Memory, wherein they are express'd.

1 a as Tall	5 ea Teal	9 y Tyle	13 oo Tool
2 a Tallow	6 i Till	10 o Tone	14 ou Could
3 a Tale	7 u Dure French	11 u Tunne	
4 e Tell	8 ui Muis Low-Dutch.	12 u Une French.	

These are the Vowels, each of which are Long and Short: Short as in the Words, God, Man, Sin; Long, as in Ball, Demand, Seen, &c.

A Diphthong, in the ordinary use of the Word, signifies a Compound of Two Vowels: but those in Ordinary so nam'd, are most of them nothing but only

only *Single Vowels*, as *ea*, *oo*, *eo*, *ai*, in the Words, *Teal*, *Fool*, *Could*, *People*, *Main*, &c. That these are but *Single Sounds*, will appear if we consider the Sounds of the *Vowels Singly*, that make those supposed Compositions, and then whether those Sounds in Composition will make out the True Sound requir'd; so as both of them may be *Clearly Discern'd* in these pretended *Compounds*. For instance, in *ea* in *Teal*; Consider the Sound of *e* in the Word *Sent*, or in the Word *Scene*; and *a* in the Word *Ball*, or in the Word *And*, or in the Word *Tale*, and then whether *e*, in either of the Two Sounds going before, and *a* in either of the Three Sounds following, joyn'd together, will make out the True Sound of *ea* in the Word *Teal*: If not, then is it a *Single Sound*. Thus if we proceed to examine all the other, you will, I doubt not, find the same Event, and I believe the True *Diphthongs* and *Triphthongs* of the *Greeks* were no other, but a true Expression of the *Single Vowels* they joyn'd together, but in so short a Time, as both or all three were Express'd in the Time that ordinarily one *Single Vowel* was expressed.

The whole number of *Consonants* are these under-mention'd, as nigh as I could Collect, by Examining all the Languages I am acquainted with, or have heard Express'd: And I think few, if any *Single Consonants*, have escap'd my Notice: All which in this following Table, I have ranged in 11 Files and 6 Ranks.

	1	2	3	4	5	6
1	B. Bond.	D. Dark.	J. Jest.	G. Game.		
2	P. Pond.	T. Tart.	Ch. Chest.	K. Came.		
3	M. Mind.	N. Name.	gn. Seignior.	ng. Song.		
4		dh. This	J. Jean.	g. Gaen.	} L. D.	V. Valley.
5		th. Thing.	sh. Shall.	ch. Dach.		Z. Zeal.
6		n. Danse. Fr.				S. Seal.

	7	8	9	10	11	
1	L. Lame.	H. Hand.	Y. Yarn.	R. Rand.	W. Wand.	Fr. signifies French.
2						L. D. Lowdutch.
3						W. Welch.
4						
5	lh. W.					
6						

The *First File* contains 3 *Consonants*, the *Second* 6, the *Third* and *Fourth* 10, the *Fifth* and *Sixth* 4, the *Seventh* 2, the remaining four each one, in all 29 *Consonants*.

The *Second Rank* in each *File* contains *Derivatives* [so I shall name them] in relation to the *First Rank*, or their *Primitives*, all alike in Kind; so also all the *Derivatives* in the 3d, 4th and 5th *Ranks*, whereby their Sounds will be comprehended.

Those

Those places fill'd with Two Strokes (=) Signifies that *Sounds* may be Express'd by the same *Posture* of the *Mouth* with their *Primitives*, answering in Kind to those in the same *Rank* wherein they stand: but they would be so like in *Pronunciation* to some others in the Table, that the Difference would be too Nice for common Discernment, and also for that I have not observ'd them used in any Language I have heard expressed by a Perfect Mouth, I thought it needless to Characterize them.

As those of the 4th and 5th *Rank* in the *First File*, are like those of the 4th and 5th *Rank* in the 5th *File*; and those of the 1st, 2^d, and 3^d *Ranks* in the 5th *File*, are like those of the same *Ranks* in the *First File*; so those of the 1st, 2^d, 3^d *Ranks* in the 6th *File*, are like those of the same *Ranks* in the *Second File*.

Some of these above mention'd 29 *Single Consonants*, are vulgarly supposed *Compounded*, as *th, ch, sh, gn, ng, &c.* But if you consider the Sound of each *Single Consonant* in the Composition apart, and then the *Conjunction* of them in that Order, so as the *Single Sounds* may be clearly Discern'd in the Composition, you will never make the *Sounds* required: and if neither by this nor by any other *Conjunction* the Required Sound can be made out, it must be a *Single*, and no *Compound Sound*.

All *Single Sounds* ought to have *Single* and *Distinct Characters*: But it will be impossible, in the Use of the Present *Characters* or *Alphabets*, to add those Wanting, and to Correct and Limit the Sound of others in Use, Thereby to constitute a *Perfect Alphabet*; because People so long Accustom'd or Habituated to the Corrupt and Differing Expressions of the Present *Characters*, will be always Subject, on the Sight of the Old, to give them those *Sounds* they have been used to, and to *Spell Words* according to their Old and Corrupt Custom, whatsoever Rules shall be set to the contrary. I have therefore, in the following Table, given a New Set of *Literal Characters*, both *Consonantal* and *Vocal*. The Set of *Consonantal* are Rang'd in the same Method and Order with those in the fore-going Table. The *First Rank* in every *File* are those I name *Radical Characters*: the other succeeding *Ranks* have each a distinct *Characteristical* Addition to Distinguish them one from another, which causeth some Complication: but yet I judg'd it necessary to express the same in the *Character*, the more regularly to Sort them into Classes, and to Express the *Derivation* of *Letters* of the same *Organ*, the one from the other.

The Set of *Vocal Characters* is likewise in the same Table. In Writing they are to be placed over the *Consonants*, which they follow in Expression; and whereas some *Syllables* begin with a *Vowel*, place the 12th *Consonantal Character* answering to the *Hebrew Aleph*, and over the same place the *Vowel* beginning such a *Syllable*. To Distinguish the *Long Vowel* from the *Short*, add a Prick to the *Vocal Character*. The 9, 11, 12, 13, 14th *Vocal Characters*, are (for want of *Single Strokes*) *Compounded* of the *First* and 2^d. The *Diphthongs*, truly such; (as I have before noted) may be made by the *Conjunction* of the *Single Vocal Characters* in order as they follow, and will be easily Distinguish'd from the 5 fore-going *Compounded Characters* of the

the *Single Vowels*, because there will not likely Occur any *Diphthongue*, Compounded of the *First 2 Vowels*.

The *Accent* may be a Thwart Line under the *Syllable* that is to be *Accented*. The 4 Marks of *Pauses* ordinarily used, namely, ;, : , . may be continu'd. The *Characters* signifying the *Various Modes* of *Expression* may be these following, and ought to be placed at the *Beginning* and *End* of every *Sentence* requiring it. *Explications.*
() *Parenthesis.* ii *Emphasis.* ?? *Interrogation.* !! *Wonder.* &c *Irony.*

The Universal Alphabet.

The Table of Consonants							
	1	2	3	4	5	6	7
1	ʒ b	ʒ d	ʒ j	ʒ g	ʒ =	ʒ =	p l
2	ʒ p	ʒ t	ʒ ch	ʒ k	ʒ =	ʒ =	
3	ʒ m	ʒ n	ʒ ġn	ʒ nġ	ʒ =	ʒ =	
4	ʒ =	ʒ dh	ʒ j	ʒ g	ʒ v	ʒ z	b l h
5	ʒ =	ʒ th	ʒ sh	ʒ ch	ʒ f	ʒ s	
6		ʒ ñ					
	8	9	10	11	12		
	ʒ h	ʒ y	ʒ r	ʒ w	ʒ ɳ		

1	2	3	4	5	6	7	8	9	10	11	12	13	14
/	/	-	ε	ɔ	i	u	ɛ	ɣ	o	u	ε	ʌ	ɔ̄
a	a	a	e	ē	i	u	ū	ȳ	o	u	ū	oo	ou

The Lords Prayer in English.

[illegible]

An Essay to-
wards an Uni-
versal Primer;
by Mr. Fr.
Lodwick. n.
182. p. 134.

II. As the Present *Alphabets* are Imperfect, so are also the *Primers* or first Books, wherein Children and others are taught to *Spell* and *Read*; First, in not having a perfect *Alphabet*: Secondly, in not being Digested in such a Method as is Fit and proper to Teach them, as they ought to be Taught. For the Usual way of Teaching to *Spell*, is to Dismember every *Syllable* (of more than one *Letter*) into many *Syllables*, by expressing every *Letter* apart, and *Syllabically*, and the *Consonants* with such a *Vowel* as they are ordinarily Nam'd with, and then requiring them to Joyn all these *Syllables* into one *Word*. But how preposterous this Method is, one Instance for all will manifest: Suppose the Monosyllable *Brand* be to be *Spell'd*, they will Teach them thus to Dismember it, *Bee, er, a, en, dee*, and then require them to Joyn these into one *Syllable*, which 'tis impossible to do; and they must be necessitated as they have begun, to Express this one *Syllable* by five *Syllables*, which was not design'd: whereas they should Teach them to express every *Syllable* Entire at first Sight, without Dismembring it. And to do this, they must Proceed Gradually; first beginning with the most *Simple Syllables*, and so by Degrees proceeding to the more Difficult and *Compound*d, till they can readily Pronounce a whole *Syllable* at first Sight, even the most Difficult that are. To that end, let all the *Primers* be thus contriv'd; at the Top of the Leaf, let all the *Vowels* be plac'd Singly in order as they follow in one *Rank*: And under the same, place *Syllables*; first of *One Vowel* and *One Consonant* following it, throughout all the Variations; then of *One Consonant* and *One Vowel* following; 2dly, of *Two Consonants* before, and *One Vowel* following, throughout the Variations; 3dly, of *One Vowel* and 3 or 4 *Consonants* following; and of 3 *Consonants* going before, and *One Vowel* following; 4thly, of *one, two, or three Consonants* going before a *Vowel*; and *one, two, three, or four Consonants* following; 5thly, of some *Syllables* with *Diphthongs* or *Triphthongs*. For Instance;

a.	e.	i.	o.	u.	&c.
ab.	eb.	ib.	ob.	ub.	&c.
ad.	ed.	id.	od.	ud.	&c.
ba.	be.	bi.	bo.	bu.	&c.
ald.	eld.	ild.	old.	uld.	&c.
dra.	dre.	dri.	dro.	dru.	&c.
baln.	beln.	bilm.	boln.	buln.	&c.

After this, Place a Number of Words of *Two, 3, or 4 Syllables*, from the more Easy to the most Difficult Expressions, without heed to their Significations. Further, let there follow some Words of several *Syllables*, with the *Accent* variously plac'd, as on the *First, Second, Third, &c.* Let there be also two or three small *Discourses* writ with this *Alphabet*, in so many

ny several Languages, with the *Accent* rightly Placed, and truly Distinguish'd by their *Pauses*.

In *Teaching* with this *Primer* ; Begin to Teach them the true Sound of all the *Vowels* Singly, then proceed to the following *Single Syllables*, beginning with the Easiest of Expression, and so proceed on gradually to the most Difficult, and then to the *Words* of more *Syllables*, and lastly, to the Use of the *Accent* and *Pauses*. When the Learner hath past all these, you may exercise him in the Reading of the *Discourses*, and therein let him exactly observe the *Accent* and the *Pauses*. When they can *Read* and *Utter* exactly whatsoever is *Written* in this *Alphabet* and *Character*, in what Language soever, Teach them to *Write* truly what they Hear distinctly Expressed, according to this *Alphabet*, proceeding therein gradually as before, and rightly to Place the *Accent* and *Pauses*, and also the Use of the *Signs* of the Different *Modes* of Speaking.

In *Teaching* also observe these necessary *Rules*. 1. Proceed Leisurely and Orderly ; suffer them not to pass by any *Mispronunciation* uncorrected, from the beginning to the end ; Cause them so oft repeat a *Wrong Pronunciation*, till with your Assistance they *Pronounce* it Truly, allowing for the Natural Defects in the Speech of some Persons. The Younger will learn these *Pronunciations* more easily : but the Elder may Attain them also, although with more Difficulty. 2. Suffer them at no hand in *Spelling*, to Dismember any *Syllable* by repeating the *Letters* Singly, but that they *Pronounce* them whole as they find them.

This *New Primer* will without Change, except in the Title, be the same for all *Nations* and *Languages*.

III. M. *Pezron's* Notion of the *Greek, Roman, Celtick Languages*, being of one common Origine, agrees exactly with my Observation : But I have not advanced so far, as to Discover the *Celtick* to be the *Mother Tongue* ; though perhaps He may not want good Grounds (at least Plausible Arguments) for such an Assertion. The *Irish* comes in with us, and is a *Dialect* of the *Old Latin*, as the *British* is of the *Greek* : But the *Gothick* or *Teutonic*, tho' it has also much Affinity with us, must needs make a Band apart.

Some Observations on Languages ; by Mr. Edw. Lhwyd. n. 243. p. 280.

IV. Whether there ever were any *Language Natural*, I dispute not : But that there have been, are, and may be *Artificial Languages*, 'tis not difficult to Prove. The *Chinese Court-Language* is said to be of this Kind, Invented and spoken by the *Literati* and *Mandarins* throughout the whole Empire of *China*, differing from all the other *Languages* spoken in it : And I conjecture it to be nothing else but the Names of the *Characters*, by which they Write and Express their Meaning, Arbitrarily imposed by them, as we in *Europe* set Names to *Arithmetical Figures*, not as we Pronounce Words written with a *Literal Character*. This I judge by comparing the *Characters* with the Names, Monosyllables, or Words, they Pronounce and Read them with. Nor do they Ascend above a Monosyllabical Name, tho' the *Character* be Composed of many *Single Characters*, each of which hath its proper

Some observations and Conjectures concerning the Chinese Characters ; by R. A. p. 180. p. 69.

per Sence and Monosyllabical Name, and tho' the Meaning of each Character be an Ingredient in the Notion of that Compounded Character.

But whatever we may judge of *Language*, 'tis past Dispute that *Writing* was ever *Artificial*, how Anciently soever it were in Use ; and was the Invention of some Thinking and Studious Men. 'Tis also Evident, that there have been various ways thought of for Expressing Significancy, according to the several *Genii* of the Persons that were the Inventors: As may be guessed by the *Egyptian Hieroglyphicks*, the *Chinese Characters*, the *Mexican Chronology*, and the *Literal Characters* of several Nations: each of which seem to proceed upon Differing Methods, and from Differing Thoughts of Invention.

Which of these ways is the most Ancient, is hard to prove. The *Egyptian Mummys* and *Obelisks* prove a great Antiquity of the *Hieroglyphicks* ; but yet the *Chinese Chronology* (if to be Credited) outstrips the *Egyptian* in pretence to Antiquity. For the *Chinese* make *Fohi* the first King of *China* to be the Inventor of their Character : And account him to have lived 2950 Years before the Time of *Christ* ; during all which Time they Pretend to have a Certain and Written Account in their Books. But their Account of the Times Preceeding, they esteem more Hypothetical and Fabulous ; depending chiefly upon Fiction and Oral Tradition: As you will easily believe, when you understand how many Years they make it since the Creation of the World to the present Year 1686 ; which by the Account thereof in Mr. *Greaves* his Translation of *Ulug Beig*, will be found to be no less than 88640102 Solar Years ; there having been run out since the Creation 8864 Ven of Years, (every Ven containing 10000 such Years) and of the present Ven this Year 1686 is 102d. Which Account is abundantly more extravagant than the *Egyptian*: but this need not invalidate their History since *Fohi* ; by which it appears that their Character was Invented before the Time of *Moses* about 1400 Years, and even before *Menes* the First King of *Egypt* about 500 Years. So that the *Chinese* Invention of *Writing* or *Characters*, seems to be the most Ancient of that kind: and the Book *Yekim*, said to be written by *Fohi*, the most Ancient Book.

These Accounts made me the more desirous to understand somewhat of the Reality and Truth of what is related concerning the Knowledge of *Literature* and *Manual Arts*, which these People of *China* are said to have possessed so long a time in so great Perfection, and without Alteration from the Primitive Institution; especially upon the Account of their Art of *Printing*, which gave a Hint to the Inventors of that admirable and most useful of all Inventions (for the Common-Wealth of Learning) the way of *Printing* here in *Europe*. For *Paulus Jovius* affirms that the first Occasion of that Invention in *Germany*, was a *German Merchant*, who returning out of *China* into his own Country, related what he had observed concerning the Practice of it as used in that Country. And tho' the *Chinese* way be wholly Differing as to the Method of *Composing*, from what was Invented and Per-

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feſted here : Yet ſuch an Intimation was enough to an Ingenious Artiſt to Improve the firſt Contrivance, and make it more accommodate to the *Literal* Way of Writing with us. And as our way may poſſibly be now brought to the greateſt perfection for Exactneſs and Expedition, ſo without doubt muſt be their way of *Printing* any thing juſt as 'tis Written, ſince I find, that they can *Ingrave* their *Stamp* for a Sheet, as ſoon as one of our *Compoſitors* can *Set* and *Correct* a Sheet of our *Literal Character*, and when ſo done, one Man alone will *Print off* 1500 Sheets in one day. And though 'tis Generally believed to be much the ſame with our *Wooden-Cuts* for *Printing*, yet from ſome Obſervations I have made, I believe it to be much another way.

By a *Chineſe* Manuscript, out of which I Tranſcribed the Lord's Prayer in the Year 1666 (when it was loſt), I found that the Pronunciations had no Affinity with the Strokes of the *Character*. Whence I conceived it was either a *Numeral Character* conſiſting of *Numbers*, or elſe a *Real Character*, but not a *Literal*, unleſs it were a *Literal Character* of ſome other Language than that by which it was Pronounced, whoſe Pronunciation is Loſt, though the Significancy be Retained : as if one ſhould read what is written in Hebrew בְּרֵאשִׁית בְּרָא into the *Latin* or *Roman* Language, *In Principio Creavit*, inſtead of *Brasit Bra*, or *Bereſith Bara*, according to the *Maſorethe*.

Since that time, I procured from *China* a *Dictionary* of the *Court-Language*, (as I found it written upon by the Perſon that ſent it me from thence.) But this whole Book (which I found was *Printed*) conſiſted only of the *Chineſe Characters*, without any Interpretation, or Pronunciation : however by the Help of the Pictures of that, and a *Chineſe Almanack*, I quickly found out their *Characters* for *Numbers*, and their way of *Numeration*, together with the *Figure* and the uſe of their *Abacus* or Counting Board, for performing the Operations of *Arithmetick*, which I find pretty near to agree with that of the *Antient Romans*, (a Deſcription and Picture of which is given by *Orſinus*, *Pignorius*, and *Velferius*) ſave only that, inſtead of Pinns and Sliding Groves of the *Roman*, the *Chineſe Abacus* hath Strings, or Wires and Beads, to ſlide upon them ; and that, inſtead of 4 Pinns for *Digits* or *Unites*, the *Chineſe* hath 5 Beads : So that it may ſeem to Argue that the *Chineſe Abacus* was deſigned for a *Duodecimal Progreſſion* : Whereas that of the *Romans* was deſigned for the *Decimal*. One thing is remarkable in the *Chineſe*, that I find the Places in the *Abacus* to lie Horizontal, and the Firſt Place to be that next the Left Hand, which I judge was alſo the Firſt in their Old way of *Reading*, much the ſame with ours, though their other *Characters* are Erected, as I ſhall by and by ſhew from the Poſture of *Writing* and *Reading*, which I conjecture they did at firſt make uſe of ; and what does yet further agree with this Conjecture, 'Tis remarkable in the newly mentioned Treatiſe of *Ulug Beig*, That whereas the way of *Writing* and *Reading* uſed by the *Arabs*, was from the Right to the Left, the Firſt Place or the Place of Units in their *Numeration*, was that next the Right Hand ; and ſo came firſt to be Read : as did that of *Ch'na*, who, as I conceive, Read the contrary way, from the Left to the Right.

It appears therefore by this Remark, that we received this way of Expressing Numbers from the *Arabians*, for that we keep the same Posture of Position of Places with them, though our Progression in Writing and Reading be the contrary way. And though we now Read them also in the order they are set, 21, 22, 36, 48, &c. yet we Retain also the other way of Pronouncing, viz. *One and Twenty, Two and Twenty, Six and Thirty, Eight and Forty, &c.*

Now as the *Chinese* and *Roman Abacus* do much agree, save only that they proceed contrary ways, so doth their way of Expressing Numbers by Letters or Marks, One Stroke or Line Signifying *One*, 2 Lines *Two*, 3 Lines *Three*, a Cross *Ten*, 2 Crosses *Twenty*, 3 Crosses *Thirty*, and so onwards to a *Hundred*, which they express'd by a Square Mark, and a Cross with a Stroke added for a *Thousand*, as will appear by the Table Annexed. And though the *Characters* are not all the same; yet the Order and Method of one agrees very near with that of the other, especially if I may be allow'd my Supposition, that the Primitive way of Writing and Reading with the *Chinese* was Horizontal, and like the *Greek* and *Latin* or *European* way. Now that these are properly *Numeral Figures* or *Characters*, is Manifest from this, that they have also *Word Characters* for every Number, and they can (in the same manner as the *Romans* could) Express a Number by their *Numeral Characters*, or *Marks*, and by their *Literal* or *Word Characters*; for as One Single Stroke signifies *One*, or the *First*; so does the *Character* (in the Plate marked with E) signify the same Thing, that is, *One* or the *First*.

Having thus discovered their *Characters* for Numbers, and their way of Numeration, I was next desirous to understand something concerning their Language and Character.

Upon Perusing all the Accounts I could meet with in Books, I found very little Satisfaction as to what I inquired after, which was *First* concerning the Method of the *Character*, whether it consisted of a certain Number of Marks methodically dispos'd like *Letters* in a *Literal*, or like *Numbers* in a *Numeral*, or like *Radicals* in *Composite* or *Decomposite Derivations*? 'Tis said to be Legible into a great many Languages considerably different one from another, but how this is Effected is not related, only 'tis said that the Marks are of the Nature of our *Arithmetical Figures* (which are become almost Universal, at least to us here in *Europe*). And *Secondly*, concerning the Number of these *Characters*? To which I found as little Satisfaction: For by some Relations I found that there were 120000, by others 80000, and by others 60000. And that a Man must be able to Remember to Write and Read at least 8000, or 10000, before he will be able to Express his Meaning thereby; and that it is the Business of a Man's whole Life to be thoroughly understanding in the *Whole Character*; seeming to intimate that the *Characters* are Immethodical, and there are as many *Primitive Characters* as Words. Others tell us of Various Kinds of *Characters* which have been in use in several Ages. The *First* they say were *Hieroglyphical*, like the *Agyptian* or *Mexican*, consisting of Pictures of Animals and Vegetables. But that the *Last* are made up of Lines and Points; that they have no such thing

thing as *Letters* or *Syllables*, but every Distinct Word and Notion has a Distinct *Character*, and that all are *Primitive* or *Incomposit* ; so that if *Calepine's* Dictionary were to be Translated into the *Chinese*, 'twere necessary to have as many Distinct *Radical Characters* as there are Words therein to be found. Which Accounts do seem to Insinuate, that this *Character* is the most Difficult, and the most Perplex'd piece of Learning in the World, and depends wholly upon the Strength of the Memory, in retaining the Form and Signification of a Perplexed Scraul. But whether they who gave us these Accounts did do it Knowingly, is much to be doubted, my own Observations at least, make me think otherwise.

I have not yet been able to procure sufficient helps to inform my self of the whole Art of *Writing* and *Reading* the *Chinese Character*, and I fear the Relations I have hitherto met with concerning it, were written by such as did not well understand it: However, from such Helps as I had, what I collected or do conjecture, I shall here relate. The best Help I had, was the perusal of some Books Printed in *China*, with the Pronunciation and Signification of the *Character* in *Latin Letters*. By these Books I then observ'd, *First*, that every one of their *Characters*, whether consisting of more or fewer Strokes, or Marks, were comprized within a certain Square Space, which is proportion'd according to the Bigness of the Size or Manner of Writing, they design there to make use of; not that the whole Square is Filled with every *Character*, but that no part of that *Character* does Exceed the Limits of that Square; so that, though the *Character* have but One Stroke, it takes as much Room in the Line as another that hath 20 or 30 several Marks; so that their *Characters* are most exactly Ranged in Rank and File, not unlike our *Numbers* in *Arithmetick*.

Notwithstanding which, I find they do Vary the Bigness of the *Character* upon several Occasions, as in the *Titles* of *Books*; in the *Titles* of the *Chapters* or *Sections*; in the *Comments*, *Explications*, or *Notes*; and upon several other Occasions of Variety, which they do at Pleasure with their Pencil, as we use Variety of Letters in the *Printing* of a *Book*. The *Titles* of *Books* are generally in very Large Characters, 6 or 8 times as big as those of the Book, the *Explication Notes*, $\frac{1}{2}$ of the Bigness; the Contents usually twice as Big; and the like Variety on Several other Occasions. I have met with also Three several Kinds of *Characters*: *First*, The most Usual is the Fixed or *Set Square* Form. The *Second* sort is the *Running Hand*, in which the Orders of the Courts are written by their Secretaries, of which I have seen Three or Four Kinds, in which the Pencil is never taken off till the whole *Character* be Finished, and some times Two or Three are all written without Break. The *Third* seems to be somewhat like the *Flourishing* Great Letters used by Scriveners at the beginning of Deeds, and by the *Germans* in the beginning of Chapters and Sections. They are compounded of the same Strokes as the *Set Character*, but modulated and shaped a little otherwise, to make them appear the more Beautiful and Regular. A Specimen of each of these Three are in the *Plate*. This 3d is made use of for *Epitaphs*, and other *Inscriptions* on Buildings or Monuments..

ments. These 3 sorts I may call the 3 General Kinds of Writing, but there is to be found an almost Infinite Variety of Forms, which Men use. This will be the more easy to be believed, when we consider that the *Printed Characters* are exactly the same with the *Written*: insomuch that every Variety in each Stroke, Line, or Point, that is or can be made with the Pencil, is perfectly expressed in the Impression; and the Form, Mode, or Hand, as we call it, of every Writer, is exhibited so curiously, that I think it hardly possible to be perform'd after the way of *Wooden-Cuts*, as Authors affirm it is, but must be done after the Method of our *Copper-Cuts*, Printed by a *Rowling-Press*, which the way of expressing the *Running* or *Court-Hand* does, I conceive, most evidently Demonstrate; and from divers Circumstances, I could evidently make appear from the Book it self, which I cannot so well express in Writing. Their *Paper* is generally very Thin and Fine, and very Transparent, but Brown; so that whatever is Written or Printed on it, is almost as Legible on the back as on the fore-side, which is of great use in the Cutting of their *Stamps*. And thence they never Write or Print on both sides of the same Leaf, but only on One; and to make the Leaf appear Printed on Both Sides, they double the Sheet with the Printed sides Outwards, and putting the Folded part forward, they Sew, Bind, or Stitch together, all these Sheets by the Cut Edges, and upon whole Sheets, instead of single Leaves. They begin the Book on the Top of the Right Hand Side of the Page that is next the Right Hand, and they Read downwards to the Bottom, then begin the next Line towards the Left Hand at the Top, and so Read to the Bottom, and so proceed to the End of the Book. But this I suppose not to be the Primitive or first way of Writing or Reading. The *Title* of the *Book* is set first upon the whole Leaf, usually of a Thicker Paper, and some *Title* is likewise written upon the Folding or Edge of every Sheet, where is set also the Number of the Book, and the Number of the Sheet, half of which appears on one side, and half on the other side of the Fold.

As to the *Character* it self, I find (by all the Books and Writings I have yet met with of that kind) that each of them is made up of a certain number of Strokes, Lines, or Marks, which are very Distinct from each other in their Shape and Position: and by reason that these are Single Strokes, and as I conceive Uncompounded, I think they may be called the *Letters*, *Elements*, or *Particles*, out of which the more *Compounded Characters* are Constructed or Contexted. These are the First Kind, of which there are but a very few, and I think those I have described in the 13th Line of the *Plate* are all.

Two, Three, Four, or More of these Joyned together, in a certain Order and Contexture, (in the doing of which there is a great Regularity and Order observ'd, which is not varied from, and all within the Regular *Square Space*) I conceive do make *Syllables* or *Primitive Radical Characters*, each of which have a Primitive, Single, or Distinct Notion, or Signification, as well as Sound; which is made much use of in the more Compounded Characters, or Words. Of this kind I take the Figures of the Numbers to be: If at least they are not Single Letters, like the way of expressing Num-

Numbers in the *Hebrew, Greek, Arabick, &c.* Languages, for though there may be Two or Three of the Single Strokes joyn'd together into a Compound Character, it hinders not, but that it may still Signify a Letter, as in the *Greek* Α. Α. Δ. Ι. Γ. Π. Τ; In the *Runick*, where every Letter hath One Upright Line and some other Additional Marks; In the *Roman* I. L. F. E. O. Q. V. Y. Or it may signify a Syllable as in the *Aethiopic*, and in the *Hanscrit*, and *Sunscrit Languages and Characters*; The First of which being the *Brackmans* Character we find in P. Kircher's *China Illustrata*, described by P. Roth, who studyed it 7 Years; and the Second (being a *Literal Character*, used over all *India* by the Merchants) I have seen in a Transcript brought lately out of *India*, by a very worthy Gentleman, who Lived there many Years, and had the Curiosity to cause to be Transcrib'd and Translated also into *English*, a Dictionary of their Language in their own Character.

In which Characters or Ways of Writing, a *Vowel* is always joyn'd with a *Consonant* into one Compound Character, to make it Effable. And then the Single Strokes may be taken for Single ineffable Letters, as are the *Consonants*, and the Composition of Two or Three, (of which one at least may be a *Vowel*) will make Syllables.

Of this Kind, there are not so many in the whole *Chinese Character*, but that it will be easy enough to assign each a Proper *Monosyllable*, which shall have only One or Two *Consonants*, and One or Two *Vowels*: That is the *Consonants* together and not separate, either both before the *Vowel* or *Vowels*, if it be a *Diphthong*, or both After it or them.

Of this Kind I understand there are about 500, probably 8 x 8 x 8, or 512. I could Enumerate a great many, and give you also the Name or Words by which they are Pronounced, as also their Significations. But (as I said before) First, I conceive the present *Chinese Language* to have no Affinity at all with the Character, the True Primitive, or First Language, or Pronunciation of it, having been lost. And Secondly, I want some further Help to make a Full and Compleat Discovery.

The 3d sort of Characters is a *Decompounded* sort, being made up of Two, Three, or more of those of the Second Kind, Diminisht proportionably in their Size, either as to their Length, or Breadth, or both, from what they have in the same Writing when they are Single, and fill up the whole Letter Square or Words Square. For there being several of them to be Croud-ed together within the same Square, according as they are more in number, so they are always more Squeez'd together. In this *Decompound* sort, there is a Regular Order observ'd in the Placing of the several Characters of the 2d sort; there being some that are always on the Left Side, some always on the Right, some at the Top, some at the Bottom. Of which I doubt not but that they have a certain Regular Method, which had we Dictionaries Explain'd would be easy enough to be discover'd.

This Method alone of Crouding together All the Characters (how many soever go to make up the *Decompounded Character*) into one Square, (which is of the same Size for the most Simple, and for the most Compound) seems to be

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the great Singularity, by which the *Chinese Characters* Differ from those of all the rest of the World. And this I conceive, has been the Reason, why all People, and possibly even the very *Chinese* themselves, have, and do believe it to be a *Real*, and not a *Literal Character* : For if the Primitive Language, or Pronunciation of the *Characters* be lost, (as I conceive it is) and that the Disposition, Order, Method, Texture, or manner of placing the more *Simple* in the more *Compound Characters* be also Lost, Forgotten, or not Understood, then the whole *Characters* become a *Real*, and not a *Literal Character* : And an Immethodical one to such as want the Method, that must be Learnt by Roat, and Depend wholly upon the Strength of the Memory to retain it. But I conceive it might be at First either a *Literal Character*, and so the whole *Square Character* was composed of so many Distinct *Letters*, or *Syllables*, which composed the *Word* signify'd thereby ; and so there might be a Regular Order of Placing these *Letters* in the *Characters* ; That is, that the whole *Square* being Divided into so many parts, there was a Rule, which was the *First*, *2d*, *3d*, and *4th* Place : So that there being Plac'd in those the several *Letters* that made up the *Word*, according to the Order they had in the *Word*, it was easy by that Rule to *Decipher* the said *Character*, and thence to find the *Word* and the Signification, as Regularly as if the *Letters* had been Written one after another, as most other *Literal Characters* we know are at this Day Written. Or, *Secondly*, it might be a *Real Character*, consisting of divers Marks or *Letters*, that Expressed so many *Simple* Notions, several of which joyn'd together might make up the more *Compound Characters*, of which I have Added some Examples in the *Plate*, which may be also made *Literal* and Pronounceable, tho' that Consideration were not made use of when they were First Invented. What things I have observed in my *Chinese* Books, that seem to respect this Method, I will give more particulars of by Printing a Specimen of the Book *Ye-kim*, which Explicated by these Notions will I conceive appear more Intelligible, than by the Accounts we find given of it by the *Chinese* Commentators, and those that have Translated them into *Latin*, who seem not to have understood the True Design thereof. For both the *Chinese* and *European* Commentators Assert it to be a *Conjuring-Book*, or a Book to tell Fortunes by, and to be made use of by the *Chinese* for that purpose : Whereas by the small Specimen I have seen of it, I conceive it to contain the whole Ground, Rule, or *Grammar* of their *Character*, Language, and Philosophy ; and that by the Understanding of it, the Foundation and Rule of their Language, and *Character*, may be without much Difficulty *Deciphered* and Understood.

The present Use of this *Character*, I conceive to be Differing from what it was at First, both as to the Position of *Writing* and *Reading* it ; and as to the Expression and *Pronunciation* thereof. For the way of *Writing* and *Reading* it, I conceive might at first be exactly the same with that of the *Greeks*, *Romans*, *English*, and all other *European* Nations, and also the *Aethiopick* and *Coptick* ; That is, they began at the top of the Page towards the Left Hand, and

and so Proceeded towards the Right in the Horizontal Line to the End of it, and then began at the Left End of the next Line under the first, and proceeded with that in the same manner, and so with the next under that, and all the remaining, Continuing to *Write* the Words of the Line towards the Right Hand, and the Lines of the Page one Under another, till the whole Discourse were compleated, joyning Leaf to Leaf one Under another, after the same manner as the *Rolls* are at present Writ, and as the *Volumina* were of the Antients. And to make the parts of the *Volume* to be the more easily to be come at, without the trouble of Rolling and Unrolling, as the Antient *Romans* did, and we do with our *Rolls*, they contriv'd to *Fold* them, like the Folds of a Fan, forwards and backwards, and so Stitching them together, that the Written Sides might lie outwards, and open freely one from another, and the Fair sides might meet together, it came to make the Present Form of their Books, which being laid, as we generally place our Books, before us, they seem to begin at the Top of the Page on the Right Hand, and to proceed to the Bottom, and then at the Top of the next Line towards the Left Hand, and Descend as in the former; proceeding in this order with all the rest. Which way must needs be very Inconvenient for Writing, however they may use their Pencil differing from our Pen. Though there be a way of Writing from the Top to the Bottom of the Page, which is very convenient for Writing the *Syriack*, as also for Writing *Latin*, *English*, or *Greek*, where the Writing is to be used for Cutting the Stamps of Wood, or Graving of Copper-Plates, with the same Character, for Printing; in which Case the Letters must be written Backwards.

Secondly, As to the Pronunciation of this Character, by the Court-Language, or by any other now used, I conceive it to be wholly Differing from that of a *Literal Character*, that is, from being Pronounced or Spoken, according to the Marks or Figures thereof, whether they be *Simple*, or *Compound* and made up of *Simple Characters*, (though there are some Instances of Affinity in Characters and Words.) The reason of which Differing Pronunciation, I conceive may have proceeded, Partly from the Loss of the Primitive Language, for which it was made; Partly from a most Inconvenient Affectation of *Monosyllabical Words* in this Court-Language; to help the Poverty of which, they are fain to make one Syllable to signify many Differing Notions; to do which, they have Introduc'd a kind of Musical Toning or Accenting of each of them, and that not Singly, but Compound of Two or Three Tones to each Signification of every one of these *Monosyllables*; Partly from the using this way of Writing, by Divers Nations of Differing Languages, who minding only the Figure and Signification, Read it in their own Mother-Tongues, as we in Europe do *Arithmetical Figures*; and Partly also from the Omission of most Grammatical Distinctions, the same Character serving for *Substantive* and *Adjective*, *Singular* and *Plural*, in all Cases, (save only they have some Characters for Particles, as *of* and *to* in *English*) for the *Verb* in all Tenses, and *Numbers*, &c. for the *Abstract* and the *Concrete* Signification, and for divers *Metaphorical*: If at least the Interpretation I have met with in the Books I have perused be Exact;

Partly also, from the *Syntaxis* of them, it being necessary to consider the whole Sentence, to Discover which Part of Speech each *Character* is of in that Sentence, wherein the Order and the Positions of the *Characters* to one another, for which they have Rules, hath its Signification ; And lastly, from the Loss of the very Notion of a *Literal Character*, whence, for the Expressing of *Proper Names*, they are Fain to make use of several *Characters*, whose Sounds or Words come nearest to the Sound of the Syllables of that Name, as in the Plate *tam, jo, vam* ; for *Adams. Jovan.*

Now, though I conceive, this *Character* is not Effable properly as a *Literal Character* by any of their Present Languages ; And though possibly it might be at First a *Real Character*, that is, each of them Compounded of such Strokes or Marks as by their Figures, Positions, and Numbers, in the *Square*, denoted the several Philosophical Ingredients that made up the Notion of the whole *Character*, as the Book *Ye-Kim* seems to shew, by giving Rules as I conceive for the Order and Significancy of Places in the *Square*, &c. Yet I think it not Difficult to make it a *Literal*, or at least a *Syllabical Character*, and Legible into a Language somewhat after the manner of the *Universal Character*, invented by the Reverend Bishop of *Chester*, Dr. *Wilkins*. And though this would not be the Primitive Language for which it was made, yet for the present Uses of it, (the chiefeſt of which is the Assisting and Refreshing the Memory, and Helping the Imagination by proper Sounds) it might be as Good : Wherein the *Single Characters* might be *Monosyllables*, and the *Compounded, Dissyllables, Trissyllables*, &c. according to the Number and Order of *Simple Characters* in the *Square* of the *Compounded*. And I am apt to think, that the Present *Pronunciation* of Languages, as of *Hebrew, Syriack, Arabick, Greek, and Latin*, or any other Language that has been so long written, may be as much Differing from what it was 2000 Years since, as an Arbitrary one now Invented, and grounded on the *Letters*, might possibly be. And such an Arbitrary *Pronunciation*, if generally agreed upon, might serve *As Well* for a Help to Learn the Signification of *Words*, or *Word-Combination* of *Characters*, as if we now knew the exact Primitive *Pronunciations*, as Critically as the *Masoretha* are said to have done that of the *Hebrew* ; and possibly also *Much Better*, for that by such a one, a great many Irregularities and Difficulties of *Pronunciation* (which are to be found in all Languages now Spoken) might be Omitted, and the whole made exactly Regular and Easy, as might be Shewn in the *Hebrew*, and *Greek*, and especially in the *Arabick*, whose Difficulties are sufficiently manifested by the *Alphabetum Arabicum*, Printed at *Rome* 1592. Now as by such a Language, the *Character* might be made Effable without *Musical Tones* or difficult *Aspirations*, so had we Dictionaries of the Signification of the *Characters*, we might as soon learn the *Chinese Character*, as we can *Latin*, or any other Language to be Learnt by *Book*, and not by *Speaking*.

Two Persons
Deaf and Dumb
taught to speak
and to Under-
stand a Lan-
guage ; by Dr.
J. Wallis. n.
61. p. 1087.

V. 1. About the Beginning of Jan. 1661. I undertook to teach a Person Dumb and Deaf to Speak and to Understand a Language ; The Task consists of two very Different parts ; each of which doth render the other more Difficult.

Difficult. For beside that which appears upon the first View, to Teach a Person who *cannot Hear*, to *Pronounce* the *Sound of Words*, There is that other, of Teaching them to *Understand a Language*, and know the *Signification* of those *Words*, Whether Spoken or Written, whereby he may both Express his own Sense, and Understand the Thoughts of others. That each of these do render the other more Hard, is obvious. We find by Experience that the most Advantageous way of Teaching a Child his First Language, is that of perpetual Discourse; not only what is particularly address'd to himself, as well in Pleasing Divertisements or Delightful Sportings (and therefore insinuates it self, without any Irksome or tedious Labour,) as what is directly intended for his more Serious Information: But that Discourse also which passeth between Others; where, without Pains or Study, he takes notice of what *Actions* in the Speaker do accompany such *Words*, and what Effects they do produce in those to whom they are Directed; which doth by Degrees insinuate the Intendments of these *Words*. But these Helps are wholly obstructed in our Case by *Deafness*. And as *Deafness* makes it the more Difficult to Teach him a *Language*: so, on the other hand, that want of *Language*, makes it more hard to Teach him how to *Speak* or *Pronounce* the *Sounds*. For there being no other Way to Direct his *Speech*, than by Teaching him how the *Tongue*, the *Lips*, the *Palate*, and other *Organs of Speech*, are to be Apply'd and Mov'd in the Forming of such *Sounds* as are required; to the end that he may, by Art *Pronounce* those *Sounds*, which others do by Custom, they know not how; it may be thought Hard enough to express in *Writing*, even to one who understands it very well, those very nice Curiosities and Delicacies of Motion, which must be Observed (though we heed it not) by him, who, without Help of his *Ear* to Guide his *Tongue*, shall Form that Variety of *Sounds* we use in *Speaking*: Many of which Curiosities are so Nice and Delicate, and the Difference in Forming those *Sounds* so very Subtile, that most of Our Selves, who *Pronounce* them every Day, are not able, without a very Serious Consideration, to give an Account, by what Art or Motion our selves Form them; much less to Teach another how it is to be done. And if by *Writing* to one who *Understands a Language*, it be thus Difficult to give Instruction, how, without the Help of *Hearing*, he may Utter those *Sounds*, it must needs increase the Difficulty, when there is no other *Language* to express it in, but that of *Dumb Signs*.

These Difficulties however did not so far Discourage me from that Undertaking, but that I did still conceive it Possible that both parts of this Task might be Effected. As to the *First* of them; Though I did not doubt but that the *Ear* doth as much Guide the *Tongue* in *Speaking*, as the *Eye* doth the *Hand* in *Writing*, or *Playing* on the *Lute*: And therefore those who by Accident do wholly lose their *Hearing*, lose also their *Speech*, and consequently become *Dumb* as well as *Deaf*, (for it is in a manner the same Difficulty, for one that *Hears* not, to *Speak* well, as for him that is *Blind*, to *Write* a fair *Hand* :) Yet since we see that 'tis Possible for a Lady to attain so great Dexterity, as in the *Dark* to Play on a *Lute*, though to that Variety

Variety of Nimble Motions, the *Eye's* Direction, as well as the Judgment of the *Ear*, might seem necessary to Guide the *Hand*; I did not think it Impossible, but that the *Organs* of *Speech* might be Taught to observe their Due *Posture*, tho' neither the *Eyes* Behold their *Motion*, nor the *Ear* Discern the *Sound* they make. And as to the *other*; That of *Language* might seem yet more Possible. For, since that in Children, every Day, the *Knowledge* of *Words*, with their Various Constructions and Significations, is by Degrees attain'd by the *Ear*; so that in a few Years, they arrive to a Competent Ability of Expressing themselves in their *First Language*, at least as to the more usual Parts and Notions of it, Why should it be thought Impossible, that the *Eye* (though with some Disadvantage) might as well Apply such *Complication* of *Letters* or other *Characters*, to Represent the Various *Conceptions* of the *Mind*; as the *Ear*, a like *Complication* of *Sounds*? For though, as things now are, it be very true that *Letters* are, with us, the immediate *Characters* of *Sounds*, as those *Sounds* are of *Conceptions*: yet is there nothing, in the Nature of the thing itself, why *Letters* and *Characters* might not as properly be apply'd to Represent Immediately, as by the Intervention of *Sounds*, what our *Conceptions* are. Which is so great a Truth, (though not so generally taken notice of,) that 'tis Practis'd every Day; not only by the *Chinese*, whose Whole *Language* is said to be made up of such *Characters* as do Represent Things and Notions Independent on the *Sound* of *Words*; and is therefore differently *Spoken*, by those who Differ not in the *Writing* of it: (like as what, in *Figures*, we Write, 1, 2, 3, for *One, Two, Three*, a *Frenchman*, for Example, Reads *Un, Deux, Trois*;) But, in part, also amongst our Selves; as in the *Numeral Figures* now mention'd, and many other *Characters* of *Weights* and *Metals*, used indifferently by Divers Nations to Signify the same *Conceptions*, though expressed by a different *Sound* of *Words*: And, more frequently in the Practice of *Specious Arithmetick*, and Operations of *Algebra*, express'd in such Symbols, as so little need the Intervention of *Words* to make known their meaning, that when Different Persons come to Express, in *Words*, the *Sense* of those *Characters*, they will as little Agree upon the same *Words*, though all Express the same *Sense*, as 2 Translators of one and the same Book into another Language.

And, though I will not Dispute the Practical Possibility of Introducing an *Universal Character*, in which all Nations, though of Different *Speech*, shall Express their common *Conceptions*; yet, that some Two or Three (or more) Persons may, by consent, Agree upon such *Characters*, whereby to Express each to other their *Sense* in *Writing*, without attending the *Sound* of *Words*; is so far from an Impossibility, that it must needs be allow'd to be very Feasible, if not Facile. And if it may be done by New invented Characters, why not as well by those already in Use? Which though to those that Know their common Use, they may Signify *Sounds*; yet to those that Know it not, or do not Attend it, may be as immediately apply'd, to Signify *Things* or *Notions*, as if they Signify'd nothing else: And consequently, so long as it is purely Arbitrary, by what *Character* to Express such a *Thing* or *Notion*; we may as well make Use of that *Character* or *Collection* of *Letters* to Express

Express the Thing to the *Eyes* of him that is *Deaf*; by which others Express the *Sound* or Name of it to those that *Hear*. So that, indeed, that shall be, to Him, a *Real Character*, which Expresseth to another a *Vocal Sound*: but signifieth, to both, the same *Conception*; Which is, To *Understand the Language*.

These were the Fundamental Grounds of Possibility in Nature: to which I Added the following Considerations, which made me think it Morally Possible; that is, not Impossible to succeed in Practice. I considered from how Few and Despicable Principles the whole Body of *Geometry*, by continual Consequence, is Inforc'd: and if so Fair a Pile, and Curious Structure may be Raised, and stand fast upon so small a Bottom, I cou'd not think it Incredible, that we might Attain some Considerable Success in this Design, how little soever we had at first to begin upon, and, from those little *Actions* and *Gestures*, which have a Kind of Natural Significancy, we might, if well manag'd, proceed Gradually to the Explication of a *Compleat Language*, and withal, Direct to those Curiosities of *Motion* and *Posture* in the *Organs* of *Speech*, requisite to the *Formation* of a *Sound* Desir'd; and so to Effect both parts of what we Intend. I was further encouraged by the Consideration of the Person, who was very Ingenious and Apprehensive, and so far at least a *Mathematician* as to draw Pictures, whereby he was already accusom'd to Observe and Imitate those little Niceties in a Face, without which it is not Possible to draw a Picture well. I shall add this also, that Once he could have *Spoken*, though so long ago, that (I think) he doth scarce Remember it. But having by Accident, when about 5 Years of Age, Lost his *Hearing*, he consequently Lost his *Speech* also; not all at once, but by degrees, in about half a Years time, which tho' it do confirm what I was saying but now, How needful it is for the *Ear* to Guide the *Tongue* in *Speaking*, (since that Habit of *Speaking*, which was Attain'd by *Hearing*, was also Lost with it,) and might therefore discourage the Undertaking; yet I was thereby very much Secured, that his want of *Speech* was but a Consequent of his want of *Hearing*, and did not proceed originally from an Indisposition in the *Organs* of *Speech* to Form those *Sounds*.

But though I did believe it Possible for him to *Learn* so to *Speak* as to be Understood: yet I could not promise my self, that he should *Speak* so Accurately, but that a Critical Ear might easily Discern some Failures, or little Differences, from the ordinary *Tone* or *Pronunciation* of other Men: Because the Neglect of it in his Younger Years, when the *Organs* of *Speech*, being yet Tender, were more Pliable, might now render them less Capable of that Accurateness which those of Children attain unto, whereof we have daily Experience, it being found very Difficult, if not Impossible, to Teach a Foreigner well in Years, the Accurate *Pronouncing* of that *Sound* or *Language*, which in his Tender Years he had not Learn'd. Besides, the *Ear* being so necessary to Guide and Correct the *Tongue*, it is not reasonably to be expected, that He who cannot *Hear*, though he may Know how to *Speak* Truly, should yet perform it so Accurately, as if he had the Advantage of his *Ear* also.

Nor

Nor could I promise, nor indeed Hope, that how Accurately soever he might Learn to *Speak*, he should be able to make so great use of it as others do: For since that he cannot *Hear* what others say to Him, as well as Express his own Thoughts to them, he cannot make such use of it in Discourse as others may. And though it may be thought Possible, that he may in time Discern, by the *Motion* of the *Lips* Visible to the *Eye*, what is said to him; yet this cannot be expected, till at least he be so perfectly Master of the *Language*, as that by a *Few Letters* Known, he may be able to supply the rest of the *Word*; and by a few *Words*, the rest of the *Sentence*, or at least the Sense of it, by a probable Conjecture, (as when we *Decipher* Letters written in *Cipher*) For, that the *Eye* can actually Discern all the Varieties of *Motion* in the *Organs* of *Speech*, and see what *Sounds* are made by those *Motions*, (of which many are Inward, and are not Exposed to the *Eye* at all,) is not imaginable. But as to the other Part of our Design, I see no Reason at all to Doubt, but that he might attain a *Language*, and the *Elegancy* of it, as Perfectly as those that *Hear*.

The way I have taken towards this Design, is in General sufficiently Intimated already; As to that of *Speech*, I must first, by the most Significant *Signs* I can, make him to Understand, in what *Posture* and *Motion* I would have him apply his *Tongue*, *Lips*, and other *Organs* of *Speech*, to the Forming of such a *Sound* as I direct. Which if he hit right, I confirm him in it: If he miss, I signify to him, in what he differed from my Direction; and to what Circumstances he must attend to Mend it. And for this Work, I was so far Prepared before hand, that I had heretofore, upon another Occasion, (in my Treatise *de Loquela*, prefixed to my *Grammar for the English Tongue*,) considered very exactly (what few attended to) the Accurate Formation of all *Sounds* in *Speaking*, (at least as to our own Language, and those I knew :) without which, it were in vain to set upon this Task. As to that of Teaching him the *Language*; I begin with that little Stock of such *Actions* and *Gestures*, as have a kind of natural Significancy: and from them, or some Few *Signs* which himself had before taken up, to express his Thoughts as well as he could, Proceed to Teach him, what I mean by somewhat else; and so by steps, to more and more: And this, so far as well as I can, in such Method as that what he Knows already, may be a step to what he next is to Learn.

He hath been already with me somewhat more than 2 *Months*; and the Success is more than I did expect. There is hardly any *Word*, which (with *Deliberation*) he cannot *Speak*: And he hath already learned a considerable part of *English Words* of most frequent Use. So that I may say the greatest difficulty of both Parts of the Undertaking is almost over: what Remains is little more than the Work of Time and Exercise.

A further Account by
ib. p. 1098.

2. The Person to whom the foregoing Discourse doth refer, is Mr. Daniel Whaley, Son of Mr. Whaley late of Northampton, and Mayor of that Town. He was Present at the Meeting of the *Royal Society*, May 21. 1662. and did there, to their great Satisfaction, Pronounce Distinctly enough, such *Words* as by the Company were Proposed to him; and though not altogether

together with the usual *Tone* or *Accent*, yet so as easily to be Understood. About the same time also (his Majesty having Heard of it, and being willing to see him) he did the like several times at *Whitehall*, in the Presence of his Majesty, his Highness *Prince Rupert*, and divers others of the Nobility. In the space of a Year, which was the whole time of his stay with Dr. Wallis, he had Read over a great part of the *English Bible*, and had attained so much Skill as to Express himself Intelligibly in Ordinary Affairs; to Understand Letters Written to him, and to Write Answers to them, though not Elegantly, yet so as to be Understood: And in the Presence of many Foreigners (who out of Curiosity have come to see him,) hath oft-times not only Read *English* and *Latin* to them, but Pronounced the most Difficult Words of their Languages (even *Polish* it self,) which they could Propose to him.

The said Doctor hath since done the like for Mr. *Alexander Popham* (a Young Gentleman of a very good Family, and a fair Estate,) who did from his Birth want his *Hearing*.

VI. In order to Teach a Language to a Deaf Person, it is necessary in the First Place that he be taught to Write, That there may be somewhat to Express to the Eye, what the Sound (of Letters) Represents to the Ear.

'Twill next be very Convenient (because Pen and Ink is not always at hand) that he be taught how to Design each Letter, by some certain Place, Position, or Motion of a Finger, Hand, or other Part of the Body; (which may serve instead of Writing.) As for Instance, the 5 Vowels *a, e, i, o, u*; by Pointing to the Top of the 5 Fingers: and the other Letters *b, c, d, &c.* by such other Place or Posture of a Finger as shall be agreed upon.

After this, a Language is to be Taught the Deaf Person, by like Methods as Children are at first Taught a Language; (though the thing perhaps be not heeded.) Only with this Difference: Children Learn Sounds by the Ear; but the Deaf Person is to Learn Marks (of those Sounds) by the Eye. But both the one and the other, do equally Signify the same Thing or Notions; and are equally (*Significantia ad Placitum*) of meer Arbitrary Signification.

'Tis then most Natural (as Children Learn the Names of Things) to furnish him (by degrees) with a *Nomenclator*; containing a competent Number of Names of Things Common and Obvious to the Eye; (that you may Shew the Thing answering to such a Name.) And these Digested under convenient Titles; and Placed under them in such convenient Order (in several Columns, or other Orderly Situation in the Paper,) as by their Position best to Express to the Eye, their Relation or Respect to One another. As, *Contraries* or *Correlatives*, one over against the other; *Subordinates* or *Appurtenances*, under their Principals; Which may serve as a kind of *Local Memory*. Thus in One Paper, under the Title *Mankind*, may be placed (not Confusedly, but in Decent Order,) *Man, Woman, Child, &c.* and if you please the Names of some known Persons; with Spaces left to be supply'd with other like Names or Words, as after there may be Occasion. Then (in Another Paper) under the Title *Body*, may be Written (in like Convenient Order)

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Dr. J. Wallis.
n. 245. p. 353.

der) the *Parts* of the *Body*, as *Head*, (*Hair, Skin, Ear,*) *Face, Neck, Breast, Belly, &c.* with like Spaces, as before, for more to be Added, as there is Occasion. And when he hath learn'd the Import of *Words* in each Paper, let him *Write* them in like manner, in Distinct Leaves or Pages of a Book, (prepared for that purpose) to Confirm his *Memory*, and to have Recourse to it upon Occasion. In a *Third Paper*, you may give him the Inward Parts, as *Skull, Throat, Stomach, Heart, Lungs, &c.* In *Another Paper*, under the Title *Beast*, may be placed the several *Kinds of Beasts*, as *Horse, Cow, Sheep, Hog, Dog, Hare, &c.* Under the Title *Bird or Fowl*, the several *Kinds of Birds*; as *Hen, Duck, Goose, Kite, Lark, &c.* Under the Title *Fish*, put *Pike, Eel, Plaice, Salmon, Lobster, &c.* You may then put *Plants or Vegetables*, under several Heads, or Subdivisions of the same Head, as *Trees, Fruits, Flowers, Herbs, Corn, &c.* And the like of *Inanimates*, as *Heaven, Sun, Moon, Stars, Elements; Earth, Metals, Minerals, Waters, Air, Meteors, Fire, &c.* Under the Title *Cloaths*, put the several Sorts both *Woollen, Linen, &c.* And under the Title *House, Room, &c.* the *Parts, Furniture, and Utensils* belonging thereunto; with Divisions and Subdivisions, as there is Occasion. And in like manner from time to time may be Added more Collections or Classes of *Names or Words*, conveniently Digested under Distinct Heads, and suitable Distributions; to be Written in Distinct Leaves or Pages of his Book; in such order as may seem most Convenient.

When he is furnish'd with a competent Number of *Names*, it will be Seasonable to Teach him (under the Titles *Singular, Plural,*) the Formation of *Plurals*, from *Singulars*; by adding *s* or *es*, *Hand, Hands; Face, Faces; Fish, Fishes, &c.* with some few *Irregulars*, as *Man, Men; Woman, Women; Foot, Feet; Mouse, Mice; Ox, Oxen, &c.* which (except the *Irregulars*) will serve for *Possessives* (to be after Taught him,) which are Form'd from their *Primitives*, by like Addition of *s* or *es*, except some few *Irregulars*; as *my, mine; thy, thine; our, ours, &c.* And in all those, and other like Cases, it will be Proper first to shew him the *Particulars*, and then the *General Title*.

Then Teach him in another Page or Paper the *Particles*, as *a, the, these, &c.* And the *Pronouns*, as *I, Thou, He, They, Who, &c.* Then under *Adjective, Substantive*, Teach him to Connect these, as *My Hand, Your Head, Their Shoes, &c.* To furnish him with more *Adjectives*, under the Title *Colours*, you may place *Black, White, Gray, &c.* and having shewed the Particulars, let him know, these are call'd *Colours*. The like for *Tast, Smell, Hearing, and Touch or Feeling*. From whence you may furnish him with Examples of *Adjectives with Substantives*, as *White Bread, Soft Cheese, My Black Hat, &c.* And then Inverting the order, *Substantive and Adjective*, (with the *Verb Copulative* between) as *Silver is White, Gold is Yellow, Lead is Heavy, I am not well, &c.* which will begin to give him some Notion of *Syntax*. In like manner, when *Substantive and Substantive* are so Connected. As *Gold is a Metal, a Rose is a Flower, Larks are Birds, &c.* Then as those before relate to *Quality*, you may give him some other Words relating to *Quantity*; as *Long, Short, Broad, Many, Full, &c.* Then
Words:

Words of *Figure*, as *Straight, Round, Concave, Convex*, &c. Of *Gesture*, as *Stand, Sit*, &c. Of *Motion*, as *Move, Run, Fly, Creep*, &c. Then Words relating to *Time, Place, Number, Weight, Measure, Money*, &c. are (in convenient time) to be shewed him Distinctly; as likewise the Names and Situations of *Places and Countries*, which are convenient for him to Know. Which may be orderly Written in his Book, and shewed him in *Maps*, &c.

After the *Concord of Substantive and Adjective*, he is to be shew'd, (by convenient Examples) that of the *Nominative and Verb*; As for Instance, *I go, He Sits, the Fire Burns*: with the Titles on the Top, *Nominative, Verb*. After this, under the Titles *Nominative, Verb, Accusatives*, give him Examples of *Verbs Transitives*; As, *You see me, the Fire burns the Wood*: Or even with a *Double Accusative*; as, *You teach me (Writing, or) to Write*. After this you may Teach him the *Flexion or Conjugation of a Verb*; or what is equivalent thereunto. For in our *English Tongue*, each *Verb* hath but *Two Tenses*, the *Present* and the *Preter*; and *Two Participles*, the *Active* and the *Passive*: All the rest is perform'd by *Auxiliaries*. Which (*Auxiliaries*) have no more *Tenses*, than the other *Verbs*. Those *Auxiliaries*, are *Do, Did*; *Will, Would*; *Shall, Should*; *May, Might*; *Can, Could*; *Must, Ought to*; *Have, Had*; *Am, (Be) Was*: And if by Examples, you can Insinuate the Signification of these Few Words, you will have Taught him the whole *Flexion of the Verb*. And here it will be convenient, (once for all,) to Write him out a full *Paradigm of some One Verb*, (suppose, to *See*,) through all those *Auxiliaries*. The *Verb* it self, hath but these 4 Words to be Learn'd; *See, Saw*; *Seeing, Seen*; Save that, after *Thou* in the *Second Person Singular* (in both *Tenses*) we add *est*; and, in the *3d Person Singular* (in the *Present Tense*) *eth* or *es*; or instead thereof, *st, th, s*. And so in all *Verbs*. Then, to the *Auxiliaries*, *Do, Did, Will, Would, Shall, Should, May, Might, Can, Could, Must, Ought to*, we adjoyn the Indefinite *See*; And, after *Have, Had, Am, (Be) Was*, the *Passive Participle Seen*; And so for all other *Verbs*.

But the *Auxiliary Am or Be*, is somewhat *Irregular*; in a *Double Form*; *Am, Art, Is*; Plural, *Are, Was, Waft, Was*; Plural *Were*.

Bee, Beeft, be; Plural *Be. Were, Wert, Were*; Plural *Were*.

Be, (Am) Was; *Being, Been*.

Which (attended with the other *Auxiliaries*) make up the whole *Passive Voice*.

All *Verbs*, (without Exception) in the *Active Participle*, are Form'd by adding *ing*; As, *See, Seeing*; *Teach, Teaching*; &c. The *Preter Tense*, and the *Passive Participle*, are Form'd (Regularly) by adding *ed*. But are oft subject to *Contractions*, and other *Irregularities*, (sometimes the Same in both; sometimes Different.) And therefore it is convenient here, to give a Table of *Verbs* (especially the most Usual) for those *Three Cases*. (Which may at once Teach their Signification, and their Formation,) as, *Roil, Boiled, Boiled*; *Bake, Baked, Baked*; &c. *Teach, Taught, Taught*; *Buy, Bought, Bought*, &c. *Give, Gave, Given*; *Write, Wrote, Written*; &c.

The *Verbs* being thus Dispatch'd ; he is then to Learn the *Prepositions* ; Wherein lies the whole *Regimen* of the *Noun*. (For Diversity of *Cases*, we have none.) The Force of which is to be Insinuated by convenient Examples, suited to their Different Significations, As, for instance *Of* ; *A Piece of Bread* ; *A Cup of Water* ; *A Pint of Wine* ; &c. And in like manner, for *ff*, *On*, *To*, *From*, *At*, *In*, *By*, &c. And by this time he will be pretty well enabled to Understand a Single Sentence.

In the last place, he is (in like manner) to be Taught *Conjunctions*, (Which serve to Connect, not *Words* only, but *Sentences* ;) As, *And*, *If*, *But*, *Because*, *Therefore*, &c. and these Illustrated by convenient Examples ; as, *Because* I am Cold, *Therefore* I go to the Fire, *That* I may be Warm ; *For* it is Cold Weather.

By this Time his Book (if well furnish'd with Plenty of Words ; and those well Digested, under Several Heads, and in Good Order ; and well Recruited from time to time as New Words occur ;) will Serve him in the Nature of a *Dictionary* and a *Grammar*. And in Case the *Deaf* Person be otherwise of a Good Natural Capacity, and the Teacher of Good Sagacity ; By this Method (proceeding gradually, Step by Step,) you may (with Diligence and due Application, of Teacher and Learner,) in a *Year's* Time or thereabouts, perceive a greater Progress than you would expect : and a good Foundation laid for further Instruction, in Matters of *Religion*, and other *Knowledge*, which may be Taught by Books.

It will be convenient, all along, to have Pen, Ink, and Paper, at hand, to Write down in *Words*, what you Signify to him by *Sign* ; and cause him to Write (or shew him how to Write) what he signifies by *Signs* : Which way (of Signifying their Mind by *Signs*) *Deaf* Persons are often very Good at. And we must endeavour to Learn their Language (if I may so call it) in order to Teach them ours : by shewing what *Words* answer to their *Signs*. 'Twill be also convenient, as you go along, (after some convenient Progress made,) to Express, in as plain Language as may be, the Import of some of the Tables. As for Instance, The *Head* is the *Highest Part* of the *Body* ; The *Feet* the *Lowest Part* ; The *Fore-head* is *Over* the *Eyes* ; &c. And such Plain Discourse, put into *Writing*, and particularly Explain'd, will Teach him by Degrees to Understand Plain Sentences. And like Advantages, a Sagacious Teacher, may take as Occasion offers it self from Time to Time.

This is the *Method* I used with Good Success about 34 Years ago, when I Taught Mr. *Alexander Popham*, who was Born *Deaf*, to *Speak* Distinctly, and to *Understand* a *Language*, so as to *Express* his Mind (tolerably well) by *Writing*, and to *Understand* what was *Written* to him by others ; As I had, before, Taught Mr. *Daniel Whaley*.

VII. *A Paper of Less General Use, Omitted. viz.*

A Catalogue of some Indian and Chinese Manuscripts, which were sent to Dr. Arthur Charlett and the Late Dr. Edw. Bernard, by Mr. George Lewis from Fort St. George, in 1698. *These Curious Manuscripts being shown to the Royal Society by the Favour of Dr. Charlett, it Appeared by a Sample or Specimen of the Leaves and Fruit of the Ampana Hort. Mal. Tom. 1. p. 13. Fig. 10. Or Palma Malabrica, Flosculis Stellatis, Fructu Longo Squamato D. Syen. ib. Or Palma Coccifera Folio Plicatili Flabelli-formi-major. Ampana H. M. Raii Hist. p. 1366. brought to the Society by Mr. James Petiver, that the several Leaves of all these Books were made of the Leaves of this Palm Wrote on by a Stile.*

VIII. *Accounts of Books, Omitted.*

1. *Petri Lambecii Lib. Primus Prodromi Historie Literarie.* n. 30. p. 575.
2. A Discourse touching the Original of Humane Literature, both Philology and Philosophy; in Two Parts: by Theop. Gale, M. A. Ox. 1669. and 1671. in 4to. n. 74. p. 2231.
3. Reflections upon Ancient and Modern Learning; by W. Wotton, B. D. Lond. 1694. in 4to. n. 214. p. 264.
4. *Librorum Manuscriptorum Academiarum Oxoniensis & Cantabrigiensis, & Celebrium per Angliam, Hiberniamque Bibliothecarum Catalogus: cum Indice Alphabetico. Cura Edw. Bernardi. Tomis Duobus in Fol. The Account of this Book is here Enlarged, and Several Instances given of the great Usefulness of such Catalogues.* n. 215. p. 160. n. 247. p. 442.
5. *Systema Bibliotheca Collegii Parisiensis Soc. Jesu. A Paris. 1678. in 4to.* n. 140. p. 1012.
6. *Juli Pflugk Equitis Saxonici Epistola ad per illustrem atque Generosissimum Virum Ludovicum a Seckendorff, Virum de utraque Republica Meritissimum, præter fata Bibliotheca Budensis, Librorum quoque in ultima Expugnatione Repertorum Catalogum exhibens. Jen. 1688. in 8vo.* n. 243. p. 335.
7. Of Education, especially of Young Gentlemen; In 2 Parts; The 2d Impression with Additions. Oxon. in 8vo. n. 113. p. 572.
8. *Alphabetum Naturæ, Auth: F. M. B. V. Helmont. 1667.* n. 31. p. 602.
9. Discourse Physique de la Parole, par M. De Cordemoy; a Paris in 120. Translated into English. Lond. 1668. in 120. n. 37. p. 736. n. 39. p. 788.
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CHAP. II.

Chronology. History. Antiquities.

- To Find the Year of the Julian Period; by R. P. De Billy. n. 18. p. 324.
- I. 1. **M**ultiply the *Solar Cycle* by 4845. and the *Lunar* by 4200. and that of the *Indiction* by 6916. Then Divide the Sum of the Products by 7980. which is the *Julian Period*: The Remainder of the Division, without having regard to the Quotient, shall be the *Year* of the *Julian Period* Required. e. g. Let the *Cycle* of the *Sun* be 3; of the *Moon* 4; and of the *Indiction* 5. Multiply 3 by 4845, and you have 14535; and 4 by

by 4200, comes 16800; and 5 by 6916, comes 34580. The Sum of the Products is 65915: which being Divided by 7980, gives 8 for the Quotient, and the Number 2075, which Remains, is the Year of the Julian Period.

2. The Julian Period is a Basis, whereon to found Chronology, not Liable to Controversy, as the Age of the World is: And 'tis the Number above-said, to wit, 7980, which is the Product of 28, (the Solar Cycle) $\times$ 19, (the Lunar Cycle) $\times$ 15, (the Indiction.) This Period (first invented by Robert Lotharing, Bishop of Hereford, and 500 Years after fitted for Chronological Uses by Joseph Scaliger) is such a Limit to Chronology, that within the Space of 7980 Years, the Number of the Sun's Cycle, the Prime, and the Year of the Roman Indiction, (which relates to their Ancient Laws and Records) can never happen alike. And these Remarks being given, the Year of the Julian Period is by the Former Rule infallibly Found.

*Demonstrated
by Mr J. Collins.
B. 30. p. 568.*

The Problem it self may be thus proposed; Any Number of Divisors, together with their Remainders after Division, being proposed to find the Dividend.

This Problem thus Generally Proposed was Resolv'd long since by John Geysius, by the help of particular Fix'd Multipliers: and to Clear up what Authors have Omitted concerning them, we say that Each of these Multipliers is Relative to the Divisor to which it belongs, and thus Define it; It is such a Number, as Divided by the rest of the Divisors, or their Product, the Remainder is 0; but Divided by its own Divisor, the Remainder is an Unite.

We Require the Divisors proposed to be Primitive each to other, i. e. that no Two or more of them can be Reduc'd to Lesser Terms by any Common Divisor: For if so, the Question may be Possible in it self, but not Resolvable by Help of such Multipliers, such being Impossible to be Found. The Reason is, because the Product of an Odd and Even Number is always Even, and that Divided by an Even Number, Leaves either Nothing, or an Even Number.

28 } Divisors, 19 } The Multipliers Relative thereto are { 3845.
15 } { 4200.
 { 6916.

The Definition affords Light enough for the Discovery of these Numbers. To instance in the First; The Product of 19 and 15 is 285, which Multiply by all Numbers successively, and Divide by 28, till you find the Remainder Required. Thus Twice 285 is 570, which Divided by 28, the Remainder is 10; also Thrice 285 is 855, which Divided by 28, the Remainder is 15. Thus if you Try on Successively, you'll find, that 17 times 285, which is 4845, is the Number Requird, the which Divided by 28, the Remainder is an Unite. Hence then we shall find

$\left. \begin{array}{l} 4845 \\ 4200 \\ 6916 \end{array} \right\}$ is Equal to the Solid or Product of $\left\{ \begin{array}{l} 19, 15, 17. \\ 28, 15, 10. \\ 28, 19, 13. \end{array} \right.$

For the *Demonstration* of the *Theorem* Propos'd we thus argue.

1. *Each Multiplier Multiplied by its Remainder, is Measured or Divided, by its own Divisor, leaving such a Remainder as is Proposed.* For before, each *Multiplier* was Defin'd to be a *Multiplex* of its own *Divisor*, plus an *Unit*. Wherefore *Multiplying* it by any *Remainder*, it doth only render it a greater *Multiplex* in the said *Divisor*, plus an *Unit Multiplied* by the *Remainder*; which is no other than the *Remainder* it self: but if 0 Remain, that *Product* is Destroyed.

2. *The Sum of the Products, Divided by each respective Divisor, have the Remainder Assigned.* For concerning the *First Product*, it is by the *First Section* Measur'd by its own *Divisor*, leaving the *Remainder* proposed; and if we Add the rest of the *Products* thereto, we only Add a *Multiplex* of its own *Divisor*, which in *Divison* enlargeth the *Quote*, but not the *Remainder*. Particularly the *Second Multiplier* is $28 \times 15 \times 10 \times \text{Remainder}$, all which is but a *Multiplex* of 28. And so the *3d. Product* is $28 \times 19 \times 13 \times \text{Remainder}$. And what hath been said concerning the *Sum of the Products*, being *Divided* by the *First Divisor*, and leaving the *Remainder* thereto Assign'd, may be said of Each respectively.

3. *The Sum of Products, Divided by the Solid of the 3 Divisors, leaves a Remainder so Qualify'd as the said Sum.* For concerning the said *Sum*, 'tis Evident by the *Second* hereof, that it is no other than the *First Product*, Increased by adding a just *Multiplex* of the *First Divisor*, that thereby we did only Enlarge the *Quote*, not Alter the *Remainder*; By the like Reason, the *Subtracting* a just *Multiplex* thereof, doth only Alter the *Quote*, not the *Remainder*; But the *Solid* of all 3 *Divisors*, Multiplied here by the *Quote*, as there by the *Remainder*, is no other than a just *Multiplex* of the *First Divisor*. Wherefore the *Remainder*, after this *Divison* is perform'd, is of the same Quality as the *Sum of the Products*: and *Divided* by the *First Divisor*, leaves the *Remainder* proper thereto. And the like may be said concerning each *Divisor*.

As in the *Method* hitherto deliver'd, we requir'd the *Divisors* be *Primitive* to each other: so, if we take the *Problem* as Generally Proposed, in the Preface to *Helvicius* his *Chronologia*, we are told, *Common Arithmetick* Fails in the Solution thereof; and *Tacquet* Denies it to be Performable by the *Regula Falsi*, and being Unlimited, we must do it by Tryals. Wherefore, *When any Two Divisors with their Remainders are Proposed, Try the Multiplices of one of them, Increased by its Remainder, and Divide by the other: If you find such Remainders as are not for the purpose, and that they are Repeated, the Problem is Impossible.*

Example. Divisors. $\left\{ \begin{array}{l} 6. \\ 8. \end{array} \right\}$ Remainders. $\left\{ \begin{array}{l} 3. \\ 5. \end{array} \right.$

The *Multiplices* of 8, Increased by 5, are 13. 21. 29. 37. 45. 53.

Those *Divided* by 6, the *Remainders* are, 1. 3. 5. 1. 3. 5.

Here you see 21, and 45, for the Purpose, and take the *Progression*, adding the Common Difference 24 (which is the least *Dividend* Measur'd by 6 and 8) and you have 21. 45. 69. 93. 117. 141.

Admit the Question had concern'd these 3 *Divisors*:

$$\left. \begin{array}{l} 6 \\ 8 \\ 9 \end{array} \right\} \text{The Remainders being} \left\{ \begin{array}{l} 5 \\ 3 \\ 6 \end{array} \right| \text{Then Dividing the former Pro-} \\ \text{gression by 9, the Remainders} \\ \text{are 3. 0. 6. 3. 0. 6.}$$

Wherefore I conclude, that the 3d and 6th of these Numbers are those Sought, to wit, 69 or 141, and so on Progressively; whereas, if you had Propounded the *Remainder* of 9 to have been any other Number, than 3. 0. 6. the *Problem*, as concerning all These, had not been Possible.

Some easy *Cases* of the *Problem* are these: When the *Remainder* of some *Divisor* is 0, and of each of the rest of the *Divisors*, an *Unit*, or less by an *Unit* than the *Divisor*. In which *Cases* you are to find such a *Multiplex* of the *Product* or least *Dividend* Measurable by those *Divisors* that have *Remainders*, which Increased or Diminished by an *Unit*, may be a just *Multiplex* of that *Divisor* that hath no *Remainder*.

II. 1. To find the Year of the *Julian Period* for any Year of our Lord proposed, it is necessary to be Furnish'd with the *Prime*, *Cycle* of the Sun, and the *Number* of the *Roman Indiction*, which the Industrious Mr. Street thus performs:

Several Chronological Problems solved by Mr. J. Collins. n. 30. p. 572.

To find the Prime Solar Cycle, and Indiction.

To find what Day of the Week any Day of the Month happens.

When 1. 9. 3. to the Year hath added been,

Divide by 19. 28, Fifteen.

The *Remainders* are the Numbers sought.

The Use of the *Prime* is, to Find the *Epact*, and thereby the *Moon's Age*, *Time* of *High-Water*, &c.

2. A farther Use of the *Sun's Cycle*, is to attain the *Dominical Letter*, and thereby To know the Day of the Week, on which any Day of the Month happens. But this is more easily and with less Caution obtain'd, by finding on what Day of the Week the *First of March* happens for ever; In brief thus:

To the Number Two Add the Year of our Lord and its Even 4th Part, neglecting what Remains, if any; then Divide that Sum by 7, and the *Remainder* (neglecting the Quotient) shews the Number of the Day of the Week, accounting Sunday First. If 0 remain, the *First of March* falls on a Saturday. Thus $2 + 1669 + 417 = 2088$. being Divided by 7, the *Remainder* is 2: shewing the *First Day* of *March* in the Year 1669. to fall on a Monday. If it were Required to perform this for Years Preceding our Saviour's Nativity, then take this Rule:

To the Year Add its Even 4th Part, the Sum Divided by 7, the *Remainder* shews the Day of the Week, accounting Sunday First, Saturday Second, and so backward.

Vol. III.

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3. To

3. To find what Day of the Month in the First Week of each Month, happens to be on the Same Day of the Week as the First of March. Use the (Plain) following Verses, in which the 12 Words relate to the 12 Months of the Year, accounting March the First.

*Ask Endless Comfort, God enough Bestows,
From Divine Axioms Faith Confirmed Grows.*

The Alphabetical Number of the First Letter of the Word, proper to the Month Proposed, is the Answer. e. g. If the Month were April, the Word proper thereto is *Endless*, and E is the 5th Letter in the Alphabet. Wherefore Conclude, that the 1st of March and the 5th of April do for ever Happen on the same Day of the Week.

4. To find on what Day of the Week the First Day of each Month happens, supposing the First of March known. It might be reckon'd from the former Problem; but the following Verses, beginning with March as the former, is more Ready for the Purpose.

*A Dreadful Fire, Beholders Daily Gaze,
Chastized England. Ah Cruel Fatal Blaze!*

Example. In the Year 1669, the First of March is Monday; I would Know on what Day of the Week the First of October happens. The Word proper to the Month is *England*; then Count Alphabetically to E, viz. A. Monday; B. Tuesday; C. Wednesday; D. Thursday; E. Friday; which is the Day sought.

Whence Conclude, that the 1st, 8th, 15th, 22d, 29th Days of October, are all Fridays. Thence it is easy to Reckon, on what Day of the Week any Day of that Month Happen'd; and so for all other Months.

The Sun's Entrance into any Sign. lb. p. 574.

5. To find on what Day of the Month the Sun Enters into any Sign of the Zodiack; *ex superabundanti*, we give the following Verse:

*Charles Brought Content, Divers Effects Ensue,
Envy, Fear, Dolour, Danger, Bids Adieu.*

Here again the 12 Words relate to the 12 Months, March being the First. To the Number of the Letters of the Alphabet the Word Begins with, Add 7, e. g. Fear is the Word for October, and F the 6th Letter: Wherefore the Sun Enters into the 8th Sign, to wit Scorpio, on the 13 of October.

The Rubricks for the Seat of Easter, according to the Julian Account, explained; by Dr. J. Wallis, n. 24. p. 185.

III. The Fundamental Rule of the Nicene Council (which we pretend to follow) for the Keeping of Easter, is to this Purpose; Easter-Day is to be that Sunday which falls upon, or next after, the First Full Moon, which happens next after the Vernal Equinox. This Vernal Equinox was then observed to fall on 21 of March, though it does now fall on the 11th of March, sometimes on the 10th of March. And therefore instead of next after the Vernal Equinox, we say, next after 21 March.

But then it is said (by a Mistake I suppose) after the First Full-Moon, instead of upon, or next after the First Full-Moon, (for so it is to be understood) and added, and if the Full-Moon happens on a Sunday, Easter-Day is the Sunday after; Which must needs be a Mistake: For in such Case, it is to be that Sunday, not the Sunday after. And so the Tables agree, (contrary to this Note) both that for 40 Years, and that to find Easter for ever. And so it was Observ'd in the Years 1668, 1678, and 1682. And so whenever the Case happens, that the Ecclesiastical Full-Moon falls on a Sunday.

The only Doubt remains on what Day we must reckon the Ecclesiastical Full-Moon to fall. For we are not to judge either the Equinox or the Full-Moon, according as they happen in the Heavens, or in our Almanacks; but according to the Paschal Tables, fitted to the Time of the Nicene Council. And accordingly we are to account the Equinox to be now (as then it was) on Mar. 21. The Golden Number (fitted to the Cycle of 19 Years; after the end of which, it begins again at 1, 2, 2, &c.) is placed in the First Column of our Calendar, to Tell us on what Day (of such a Year) the New-Moon is supposed to happen, in each Month; and the 15th Day of that Moon is Reputed the Full. Thus the Golden Number for the Year 1698, is 8. (That is, this is the 8th Year of such Decem-novenal Cycle, or Circle of 19 Years; commonly call'd *Cyclus Lunar*, or the Circle of the Moon; as the other Circle of 28 Years is call'd, *Cyclus Solar*, the Circle of the Sun, or rather of the Sunday-Letter.) And this Number 8 stands in the Calendar at Mar. 6. which we must therefore suppose to be New-Moon: (Though the New Moon were indeed Mar. 2.) Now Mar. 6. being the New-Moon, or First Day of the (reputed) Lunar Month (for such Year) Mar. 20. will be the 15th Day, or the (reputed) Full-Moon for the Month of March this Year, which happens to be Sunday; the Dominical Letter for this Year being B. But this happening before Mar. 21. (the Supposed Equinox) cannot be the Paschal Full-Moon; but we must wait for Another. And we shall then find the Golden Number 8 standing at Apr. 5. for the New-Moon of April, the same Year. And therefore the Full-Moon, or 15th Day of that (reputed) Lunar Month, is to be Apr. 19. Which being Tuesday, the Sunday next following is Apr. 24. (where stands B, the Sunday Letter for this Year) which is therefore to be Easter Day, according to the Intent of these Tables; and it was Observed accordingly.

But it were to be Wished, there had been somewhere a Rubrick, to Direct How we are to Find this (reputed) Full-Moon; and what is the Use of the Golden Number.

The Difference of the Ecclesiastick Account, in the Paschal Tables, from that of the Heavens (both as to the Equinox and as to the Full-Moons) doth arise from hence:

1. The Common Julian Year (by which we Reckon) of 365 Days and 6 Hours, is somewhat too Long; being about 11 Minutes of an Hour Longer than the True Solar Year. By Reason whereof, the Equinox (and other Annual Seasons) go forwards about 11 Minutes, every Year. Which from the

Time of the *Nicene Council*, till Now, amounts to about 11 Days, so that the *Equinox* which then happen'd *March 21*, is now come back to our *Mar. 10*. Which, upon Pope *Gregory's* Reforming the *Roman Calendar*, (above 100 Years since) causeth the Difference of 10 Days, between what we call the *New Stile* and the *Old Stile*.

2. It was then supposed, that in 19 Years (which is the Compass of the *Golden Number*) the *Lunations* (of *New-Moon* and *Full-Moon*) did Return to the same Day and Hour, as they were 19 Years before. But though this be pretty near the Truth, yet it comes short by about an *Hour and half*: which *Hour and half*, in every 19 Years, doth since that time amount to 4 or 5 Days. Whence it comes to pass, that the *Reputed Full-Moon* is Later, by 4 or 5 Days, than that of the *Heavens*. But our *Easter*, is Reckon'd according to the *Reputed Full Moons*, (derived from the *Golden Number*) not according to those of the *Heavens*.

A Report of
the Consultation
upon Mr. Dee's
Proposal for Re-
forming the Ca-
lendar, A. 1582:
by the Ld Treas-
urer Burleigh,
n. 257. p. 355.

IV. 1. It was Agreed by Mr. Digges, Mr. Savile, and Mr. Chambers, that upon their several perusal of the Book written by Mr. Dee, as a Discourse upon the *Reformation of the Vulgar Calendar* for the *Civil Year*, that they do Allow of his Opinion, that whereas in the late *Roman Calendar* Re-form'd there are 10 Days cut off, to Reduce the *Civil Year*, to the State it was established in at the *Council of Nice*, the Better *Reformation* had been to have cut off 11 Days, and to have Reduc'd the *Civil Year*, according to the State it was in at the *Birth of Christ*. And so they all Agree, that such a *Reformation* had been more Agreeable to the *Account of Christ*. And so they do also Assent, that having Regard to the *Council of Nice*, the Substraction of 10 Days, is Agreeable to Truth. And therefore the better to Agree with all Countries adjacent they have receiv'd their *Reformation* of Substracting 10 Days only, they think it may be Assented unto without any Manifest Error: Having Regard to Observe certain Rules Hereafter, for Omitting some *Leap-years* in some Hundred Years. And for the Substracting of 10 Days, Mr. Dee has Compiled a Form of a *Calendar*, beginning at *May*, and ending at *August*, wherein every of these 4 Months, *May*, *June*, *July*, *August*, shall have in the Ends of them some Days taken away without Changing of any *Feast* or *Holy-Day*, Moveable or Fix'd, or without altering the *Courses* of *Trinity-Term*, that is to say, *May* to consist of 28 Days, taking from it 3 Days; *June* to have 29 Days, taking from it but 1 Day; *July* to consist of 28 Days, taking from it 3 Days; *August* to consist of 28 Days, taking from it 3 Days: All which Days Substracted make 10 Days. In the which 4 Months no *Festival Day* is Changed, but remain upon the accustom'd Days of their Months.

And because the *Roman Calendar* hath Joyn'd to it a great Company of Rules, of which only are Capable the *Skilful Computists* or *Astronomers*, it is thought Good to make a short Table like an *Ephemerides*, to Continue the Certainty of all the *Feasts* Moveable, Depending only upon *Easter*, and Agreeing with the *Roman Calendar*: which may serve for One Hundred or Two Hundred Years; and so be easily Renewed, when there shall be Occasion for it.

2. The

2. The Reformation of the Roman Calendar, proposed by Mr. Dee, as I cannot wholly Approve, so I cannot altogether Disapprove. For I like the Substraction of 10 Days; as the Church of Rome has done, beginning the Computation from the Council of Nice: though it cannot be Deny'd, but that the Reformation from the Time of our Saviour had been much Better. But since the Fathers of the Council of Nice thought it more Wisdom to look forwards than to look Backwards; and to have greater Care of avoiding Distractions in the Church, about the Celebration of Easter for the Future, than to Remedy the Errors past: I think we shall do well with the Church of Rome to follow their Example. And whereas some have thought of a more Exact Calculation, than this Emendation, introduc'd by Pope Gregory the XIII, which they ground upon the late Astronomical Observations of the Learn'd Tycho Brahe: yet since the Difference is not so great, as to make any sensible Error in many Ages, and since that Error may be easily Corrected by the Omission of an Intercalary Day, I think it not fit for so small a Nicety, to make a new Dissention in the Church. Much less am I of their Opinion, who think that this Correction of the Year is Therefore to be Rejected, because it comes recommended by the Church of Rome: which were all one as to Refuse some Wholsome Potion, because it is Prescrib'd by a Physician, whose Manners we approve not of.

But I cannot Subscribe to his Opinion, that this Reformation should be by the Substraction of 10 Days out of one Year alone. For tho' I grant, that this were a quick Cure of a lingring Disease, yet it is against all Rules of Art in Curing one Malady to make 10. For it cannot be but that the Defalcation of 10 Days in one Year must be of Infinite Disturbance in the Common-wealth in all Contracts, where necessarily a certain Time is Defin'd. I shall therefore Humbly recommend to his Majesty's Wisdom and Favourable Consideration, that Course which was long since Proposed by many Able Mathematicians to Pope Gregory, upon the first notice of his Purpose of Correcting the Calendar. The manner was this; That for 40 Years Space there should be no Bissextile or Intercalary Years, or as we call them, Leap Years, Inserted in the Calendar. By which Course it is most Evident, that 10 Days will be Subtracted in 40 Years, and these 40 Years will be each of them *Anni Equabiles*, consisting of 365 Days, as our Common and Ordinary Years do, without any Alteration in the Whole Year. And this being beyond all Exception, had been readily entertain'd by Pope Gregory, had not his Ambition been greater than his Judgment; for He was willing to have the Honour of this Emendation, and not to Leave it to his Successors; whereby the Year ever since has been call'd *Annus Gregorianus*.

3. Against this Expedient of Observing No Bissextile for the Space of 40 Years, or now of 44 Years, there seems to me this great Objection. In the Time of Julius and Augustus Caesar, there was a Year which was call'd *Annus Confusionis*: Upon the Settling and Resettling the Julian Year. (Of which Kepler gives an Account, with the Mischiefs of it;) And the like in the Year 1582, when Pope Gregory did at Once strike out 10 Days of that Year.

Consider'd An.
1645; by Mr.
J. Greaves. lb.
p. 316.

An. 1692. by
Dr. J. Wallis.
lb. p. 343.

Tab. Rudolph.

Year. But if this Advice should take Place, we should now, instead of One *Annus Confusionis*, have a Confusion for 44 Years together: wherein we should Agree neither with the *Old* nor with the *New Account*; but be sometimes 10 Days, sometimes 9 Days, sometimes 8 Days, (and so forth) Later than the *One*, and sooner than the *Other Account*. And a Foreigner would not be able to judge of an *English Date*, without knowing in which of these Years, we Vary 10, 9, or 8 Days (and so forth) from either of these *Accounts*. And this for 44 Years together. Which seems to me a much Greater *Confusion*, than if (as in 1582) we should (once for all) cast out 11 Days. But I cannot think it Adviseable to do *Either*.

The Julian Account not to be changed for the Gregorian; by Dr. J. Wallis, m. 257. p. 343, 350.

V. Concerning the *Alteration*, at this time Suggested, of the *Julian Account* for the *Gregorian*, I am at a loss what to say. That there is in our *Ecclesiastical Computation* of the *Paschal Tables* somewhat of Disorder, is not to be Deny'd: But I am very Doubtful, that if we go to *Alter* that, it will be attended with greater Mischief, than the present Inconvenience. By removing *Ptolomy's First Meridian*, (though upon some Plausible pretences) it is now come to pass, that we have (in a manner) *No First-Meridian* at all; but every *New Map-Maker* placeth his *First Meridian* where he pleaseth: which hath brought a great *Confusion* in *Geography*. 'Tis Agreed by most (if not all) *Chronologers*, that as to the *Year of our Lord*, the *Annus Vulgaris* is not the *Annus Verus* (though it be not Agreed how much it differs:) But it would be a Horrible *Confusion* in *History*, if we should now go about to alter this *Vulgar Account*. And as to the Disorder in the *Paschal Tables*, it was a thing Noted and Complain'd of for 3 or 400 Years, before *Pope Gregory* did (unhappily) attempt the *Correction* of the *Calendar*. But it was, all that time, thought Adviseable, rather to suffer that Inconvenience, than, by *Correcting* it, to run the hazard of a Greater Mischief.

The *Celebration of Easter a Week* or a *Month* Sooner or Later, doth not Influence at all our Solemn Commemoration of *Christ's Resurrection*. But if it be thought necessary that the *Seat of Easter* should be Rectify'd, and the *Paschal Tables* Corrected, (and *Pope Gregory* made no other pretence) that may be easily done. For, if in the *Rule for Easter*, instead of saying *Next after the 21 of March*, you say, *Next after the Vernal Equinox*, the work is done. And we might be excused the trouble of *Paschal Tables*, and the Intricate Perplexities of the *Gregorian Epacts*. For then every *Almanack* will tell you when it is *Equinox*, and when it is *Full-Moon*, for the Present Year, (without disturbing the *Civil Account*.) And this *Pope Gregory* might as well have done, without troubling the *Account of Christendom*. But if he would needs Disturb the *Civil Year*, he should have Rectify'd it (not to the Time of the *Nicene Council*, but) to the Time of our *Saviour's Birth*. For our *Epocha* is not from the *Nicene Council*, but from the *Birth of Christ*. And most certain it is, that, at our *Saviour's Birth*, the *Vernal Equinox* was not on the 21st of *March*, (as the *New Account* would suppose,) but nearer to the 25th.

However,

However, this Pretended Reformation of the Calendar Introduced that Confusion of Old and New Stile, which we now complain of: And which now can never be Remedied, unless all Nations should at once Agree upon One. I say at once; for if some Sooner, and some Later do Alter their Stile, the Confusion (in History) will yet be greater than now it is. 'Tis true, that upon Pretence of the Pope's (Usurped) Supremacy in Spirituals, (and in Temporals also in Order to Spirituals) most Popish Countries (but I think not All) have Submitted their Civil Year (as well as their Ecclesiastical) to the Single Authority of the Pope's Bull. But the Church of England had long before this Pretended Correction Renounc'd the Pope's Supremacy: And is therefore Unconcern'd in it. And I see no Reason why (after so long a Disclaimer) we should be Now fond to Re-admit it: For what greater Evidence (of Owning that Authority) can (in Practice) be Expected, than obeying their Commands in things (otherwise) Unadvisable? No doubt the Hand of Joab is in this Matter, though perhaps we do not see it. Besides, This Alteration Cannot be made without altering the Common-Prayer-Book; (For, at least, all the Calendar must be New framed:) And some are so Warm against Touching That in the Least, that they are even against Considering whether Ought in it may be Chang'd for the Better. Had this been started in King James's Time, with what Face would it have Look'd? And if the Mask be taken off, the Face is still the same.

But 'tis not England Alone that useth the Julian Year; But all the 3 Kingdoms of England, Scotland and Ireland; and all our Foreign Plantations, which are not a few; and the two Kingdoms of Denmark and Sweden; the Protestant Cantons of Switzerland; and 4 of the 7 United Provinces; and many of the Protestant States in Germany. So that if We should Change our Stile in Compliance with some of our Popish Neighbours, from whom we Differ, we should then Vary from the Protestants with whom we now Agree; And particularly from Scotland, with whom we are more concern'd to Agree than with France. A new Law in England would not comprise Scotland: And we cannot promise our selves that they would Presently Comply also. They are not so Pliable to the Modes of Rome as some in England are: As is Evident in their not Admitting Episcopacy; and the Business of Easter (which was the Sole Pretence for the First Alteration) would to them, signify nothing, who (according to their Constitution) observe No Easter at all, but do rather declare against it.

If it be said, that the other States may, in time, be Induced to follow our Example: Perhaps some may (not at All:) but this would but make the Confusion yet greater. For thenceforth, we must be obliged (if we would understand their Dates, and be at a Certainty in History) not only to Know what Countries do Use this or that Stile; but, from what Time they Began so to do. So that there will still be as great Necessity of S. V. and S. N. (Old Stile and New Stile) as now there is: And with that Distinction we are now as easie as if we Change.

That

That the *Old Julian Year* is in it self a better Form and more Adviseable than the *New Gregorian*, is so Notorious, that all *Astronomers* (even *Papists* themselves) are fain first to Adjust their *Calculations* to the *Julian Year*, and thence Transfer them to the *Gregorian*. The *Equinox* going Backward (for 10 or 11 *Minutes* each Year,) is very Inconsiderable, and which in *Celestial Computations*, is easily Rectify'd; as are many other Inequalities of much Greater Concernment. And I think it was never pretended that the *Civil Year* must needs Agree (exactly to a *Minute*) with the *Celestial*; and if never so much Affected, is Impossible to be had. For the *Solar Tropical Year*, and the *Sidereal Year*, Differ more from each other, than the *Julian* from either; which is a Middle betwixt them.

It would therefore be much more Adviseable (if the *Papists* would be as Compliant as they would have us to be) for the *Papists* to return to their *Old Julian Year*, than for us to Embrace their *New Gregorian*. And it might much Easier be Effected: For, if the *Pope* could be perswaded to Grant a *Bull* to that purpose, All the *Papists* would, at once, be as much obliged so to do, as by *Pope Gregory's Bull* to vary from it. If it be said, there is no Hopes of that; Then the Argument stands thus: If the *Pope* will not Leave his *Pretended Supremacy*, then we must Admit it. But this surely is no Inducement for Us to Exchange our Better *Julian Year* for one that is much Worse.

The Conclusion
of the Protest-
ant States in
Germany An.
1699. for Refor-
ming the Calen-
dar; by . . .
n. 250. p. 459.

VI. The *Protestant States* of the *Empire* in the *Imperial Diet* of *Regensburg*, having Deliberated upon the Projected Reformation of their *Almanacks*, have Resolved on the following Particulars.

1. That after the 18th of February 1700, *Old Stile*, the following 11 Days shall be left out in the *Almanacks*, and the *Feast* of *St. Matthias* be kept on the 18th of February aforesaid.
2. The *Computation* of *Easter*, and the *Fasts* thereon Depending, shall for the future be Calculated according to the True *Astronomical Calculation*; and this to continue only for this following *Century*, the *Astronomers* being left at Liberty, in the Mean Time, to Consult on further Methods, to prevent any Further Variation.
3. The *Mathematicians* shall be ordered to Consider how, for the future, the Abuse of *Judiciary Astrology* in the *Almanacks* may be Abolished.

This Resolution doth not Proceed from any Condescendence to the *Roman Catholics*, nor can be Interpreted an accepting of the *Gregorian Calendar*, considering, 1. The *Omission* or leaving out of these 11 Days Intercalated, is quite Different from that which they had done before; for here the *Calculation* of Time is only Reduced to the Course of the *Sun*, as it was before the *Nicene Council*. 2. Wherefore the Principal Thing in the *Gregorian Calendar*, and the *Gregorian Cyclis*, is yet Retained by them. 3. The *Astronomical Computation* of *Easter* in the *New Calendars*, is a Perpetual and Annual Real Protestation against the Injunction of *Pope Gregorius*; and yet, 4thly, the Different Methods of *Computation* (the *Astronomical* which We Use, and the *Cyclis* which They Use) to find the *Easters* and *Fasts* depend-

Depending thereon, makes no great Difference in the thing itself, except in One only Case, otherwise they fall every Year on the same Day. This Case is, That *Our Easter* will fall 8 Days Later than *Theirs*, when the *Aequinoctial Full-Moon* shall fall too near a *Sunday*. For then the *Gregorians*, according to their *Cyclus*, will observe their *Easter* on the *Sunday* immediately following: But the *Protestants*, to avoid observing *Easter* on the same Day with the *Jews*, which, according to the *Astronomical Calculation*, keep their *Easter* 8 Days after; and that according to an *Ancient Rule*, and Practice of the *Christian Church*, which, when *Easter Full-Moon* fell on a *Saturday*, and that *Saturday* happened to be the 21st of *March*, then the *Easter* is to be observed on the *Sunday* following, 8 Days after.

This *Resolution* will not be an Occasion of any further *Variance*, and Difference in the *Computation* of Time. For, 1. The Numbring of the Days continues Uniformly without any Difference all the next *Century*; and before this *Century* be Ended, a Method will be Found, to Agree about the *Secular Intercalary Day*. 2. The *Gregorians Calendar* does not Depart much, nor will hereafter, from the *Course* of the *Heavens* and the *Canons*; and except in the aforesaid Case, the *Computations* of *Easter* will every Year actually agree. 3. It is not now necessary to trouble ourselves with the Feared Notable Removing of *Easter* from its due *Term*, which the *Gregorian Calendar* will occasion; for before that happens, if the World shall stand yet many Ages, Means will be found to Prevent it.

If any *Correction* of the *Gregorian Calendar* should Happen (which is hardly to be Presumed), yet our *Astronomical Calculation* will always be more Accurate than their *Cyclus*, and if they will not Transgress against the *Canons*, and the *Course* of the *Heavens*, they must comply with us. It being thought fit that 11 Days should at once be Left out, it was also thought best to do it immediately before the 1st of *March St. No.* and that in the Year 1700, instead of Writing and Numbering after the 18th, the 19th of *Feb.* to Write the 1st of *March*; and that because 1, in these 11 Days is no *Feast-Day*, and *St. Matthias* falls on a *Sunday*, so that it's all one whether it be Observed on the one or the other *Sunday*, 8 Days sooner or later. 2. Because thus the *Old* and *New Stile* will be fully United and Reconciled, and that at once.

VII. The *Garter* shews the *Number of Days*, (30, 29, 30, 29, &c.) which each of these 12 Months of the Year is to Contain: And in the *Buckle* is discovered through a *Hole*, the Days of a 13th Month (31, 30, 31, 30, &c.) to be Added to the Years, 2, 5, 7, 10, 13, 15, 18, 21, 24, 26, 29, 32, 34, 37; in all to 14 of 38, as in a *Cycle* behind; which being supposed Moveable one 38th part every Year backwards, or contrary to the Months in the *Garter*, its Revolution is Completed in 38 Years: And the 38th Year Current, or the Year of the *Period* or *Cycle*, is shewed through another *Hole*.

Once every *Century*, or to one Year in 100, add One Day, viz. To the First 50th Year, or middle of the *Century*, or rather to the First 70th Year,

Vol. III.

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(because

A New Lunisolar year, and a Perpetual Almanack; by Mr. R. Wood Ph. Col. n. 2. p. 26.

Fig. 2. 3.

(because the First New-Moon, March 10, 1680, happens a little after Midnight, and after the Vernal Equinox) and then to every 100th Year following; which Additional Day being Omitted every 230th or 240th Century, (or near thereabouts, if any one shall require such great Exactness) will Ballance the Account for ever.

The New-year, and Account, may best Begin with the Vernal Equinox; or rather with the Day of the New-Moon happening near Midnight about that Time, as March 10, 1680.

The Egyptian Hieroglyphick of the Year was a Serpent Carved into a Circle or Ring, with Tail in Mouth; but the Emblematical Garter will be much more proper for England; and is so exactly fitted to the Moon's Motion, that One Day will not be Lost or Got in Millions of Years.

(.) Almon-ac
Our Ancestors
used to Carve
the Count of
the Moon of
the whole Year
upon a Squared
Stick which
they called an
Al-monacht,
that is, Al-
moon head.
Versteegan. p. 58.
The Dutch Al-
maenacht im-
ports the same.

This (a) Almon-ac Measures Time principally by the Moon; but with a Great and near Respect to the Annual Motion of the Sun on Earth. The Unit or least Measure is a Day; and the Garter or Luni-solar Year will be at a Medium, within about a Week, or Half a Hundredth-part, of the True Solar Year; that is, so near, that the Difference will not be Discerned by Ordinary Popular Observation, (and therefore must needs answer the Ends of Husbandry, and other Civil Affairs, well enough) and come often Near, and sometimes very Near; and at certain Periods they Ballance one another; and have a kind of Co-incidence or Agreement, much better than the Sun's Course has with the Italian Account, so much magnify'd by Scaliger and others.

I find the Elder World generally Computed their Time (and most of the Eastern Countries, if not the Bulk of Mankind, do so still) by the Moon, or by the Lunar, or Luni-Solar Year; made up of Moons, or Real Months, or somewhat near the Matter such; which Months were for the most part 12, and some Years 13. This appears from their Calendars, &c. 'Tis plain (from 1 Sam. c. 20. v. 5, 18, 24. compared with v. 27, 34.) that the Days of the Jewish Month were the same with those of the Moon: And the Grecians (where Astronomy, as well as other Arts and good Learning most Flourish'd) and particularly the Athenians, (according to the Institution of their Wise Legislator Solon) did thus Reckon their Time; and so did the Romans too, till Julius Caesar Alter'd, I cannot say Mended, the Year.

Among the Grecians there Lived, in three not far distant Ages, three famous Astronomers in their several Times, Meton, Calippus, and Hipparchus; each of whom still farther improved Astronomy, and Rectify'd the Accounts of Time more and more one after another respectively, according to their Light, and the Observations of their own and the foregoing Ages. Hipparchus, the Last of them, flourished about 100 or 90 Years before Julius Caesar Alter'd the Year: Yet Caesar, or his Astronomer Sosigenes, follow'd Calippus in Framing the Julian Year; as I find by Examining their Accounts. For Calippus his Period of 76 Years consisted of 27759 Days, and so do 76 Julian Years. About 3 Centuries and a Half after Caesar, the Council of Nice (first), and about 2 Centuries after that, Dionysius Exiguus (again) introduc'd the Decennoval Cycle (call'd the Golden Number), for the Celebration of Easter; following

following *Meton*, the first and least Exact of the Three; or rather following both *Meton* and *Casar*, two Masters, who were neither of them the best, and would after some time Disagree and Part further from each other; tho' both *Casar* and the Church might have had a much better Copy from *Hipparchus*: Which Mistakes of theirs (and their Eyes being Dazled with the Sun, whereas they might more safely have looked on the Moon) have occasion'd those Anticipations and Differences, that have Embarrass'd the Accounts of Time, and these Parts of the World in the succeeding Ages. And though many have propos'd Laudable Ways of Redressing the said Accounts, yet still Building upon the Old Foundations which were Infirm: Pope Gregory XIII, in his Reformation of the Calendar, about 100 Years since, was necessitated to wave the Golden Number, and yet he has but Palliated the Disease; so hard it is to Cure an Error in the first Concoction.

The Council of Nice appointed Easter to be kept the First Sunday after the First Full-Moon after the 21st of March, because the Vernal Equinox, which was on the 25th in our Saviour's Time, was then come to be on the said 21st Day, and Therefore the Gregorian Reformation has Reduced the Vernal Equinox back to that Day. But in this Garter-Year, Easter will always be the First Sunday after the First Full-Moon of the New-Year; that is, after the Vernal Equinox, according to the true Intent and Meaning of the Nicene Council; or as it was in the Primitive Times: and be but a Week Moveable, or a Month less Moveable than now, either after the Old or New Style: Which might perhaps have Prevented the Difference, or Served as an Expedient for reconciling the West and East Churches.

The three Cycles of *Meton*, *Calippus*, and *Hipparchus*, were all of them too large for the Sun, and Primarily Intended for the Moon, or for a Luni-solar Year; however that of *Hipparchus* was Nearest to both, and very near the Moon's Period.

Perhaps at first View, my 38 Years Period may be looked upon but as a Double Metonic, or Semi-Calippic one, &c. But upon farther Consideration it will be found otherwise: For *Meton* and *Calippus*, their Periods, as also that of *Hipparchus*, were all of them too Big, not only for the Circuit of the Sun, as I said before, but for that of the Moon also; whereas Mine, on the other hand, is too little for either, and Needs one Additional Day in near about every 100 Years.

Meton's 19 Year Cycle, or Enneadecaeteris, had 6940 Days, } 13880
the Double whereof is

Calippus his Period, or 76 Years, had 27739 Days, the Half } 13879½
whereof is

Hipparchus his Period, of 304 Years, had 1111035 Days, the } 13879½
8th part whereof is

Whereas My 38 Years Period hath but just Days 13879

So that it may easily appear to any One who shall please to Examine it, wherein my Cycle or Period Differs from all Theirs: But the Frame of my

Contrivance of this so Nice Matter, for the easie Explication thereof, even to the Grosest Capacities, as to Practice and Use, is Wholly Different from Theirs, and every one's else I ever yet heard of.

I chose rather to take the *Revolution* of the *Moon*, than that of the *Sun*, for my Chief and Primary Measure of *Time*; Because, *First*, the *Lunar Phases*, and consequently *Months*, are more easily Discerned, than the *Sun's Annual Period*, even by the most Ignorant Vulgar Eyes; who need but look up, almost any Night, to see their *Almanac*. Next, The Observations upon the *Moon*, made by the more Knowing Men, have been more in Number, more Exact, and of far greater Antiquity; *Astronomers* having had the help of *Eclipses* of very Distant Ages, for their Guide, in Finding out very near the True Measure of the *Moon's Mean Motion*. Lastly, Keeping an Account by the *Moon*, we may reckon by the *Sun* also, that is to say, by *Months* and *Years* too; whereas, on the contrary, reckoning by a *Solar Year* the *Months* are but Empty Names, and in *Measuring* of *Times* and *Seasons* the *Moon* is Rendered of no Use; though some *Inanimate Bodies* (so Considerable, that they take up and possess perhaps Half this our Globe) as the *Seas*, do exactly observe the *Moon's Course*; and there are *Living Creatures* also thought perhaps no less Considerable, at Land, that do the like; which I need not mention, nor take any farther Notice of the near Affinity, if not Consanguinity, with the Garter.

The Time and Place of Cesar's Descent upon Britain; by Mr. Edm. Halley. m. 193. p. 495.

VIII. The Authors that Mention *Cesar's Expedition* into *Britain* with any Circumstances, are *Cesar* himself and *Dion Cassius*. It is certain that this Expedition of *Cesar*, was in the Year of the Consulate of *Pompey* and *Crassus*, which was in the Year of *Rome* 699, or the 55th before the usual *Ara* of *Christ*: and as to the Time of the Year, *Cesar* says that *Exigua parte Aestatis reliqua*, he Came over only with Two Legions, viz. the 7th, and 10th, and all Foot, in about 80 Sail of Merchant Ships, 18 Sail that were Ordered to carry over the Horse, not being able to get out at the same time from another Port, where they lay *Wind-bound*. He says, that he Arrived about the 4th Hour of the Day, viz. between 9 and 10 in the Morning, on the Coast of *Britain*: where he found the Enemy Drawn up on the Cliffs ready to Repel him; which Place he thus Describes, *Loci hac erat natura, adeo Montibus Angustis Mare continebatur ut ex locis Superioribus in Littus Telum adjici possit*, by which the Cliffs of *Dover* and the South-Foreland, are justly Described; and could be no other Land, being, he says, in the 5th Book of his *Commentaries*, in *Britanniam Trajectum esse cognoverat circiter Millium Passuum Triginta à Continenti*. Here he says he came to an Anchor, and staid till the 9th Hour, or till about between 3 and 4 in the Afternoon, expecting till the whole Fleet was come up; and in the mean time call'd a Council of War, and Advertised his Officers, after what manner they were to make their Descent, particularly in Relation to the Suff of the Sea, whose Motion he calls *Celerem atque Instabilem*, Quick and Uneven. Then, viz. about 3 in the Afternoon, he Weighed Anchor, and having gotten the Wind and Tide with him, he Sailed about 8 Miles from the

the *First Place*, and Anchored against an Open and Plain Shore. Here he made his *Descent*, and having told us the Opposition that was made, and the Means he used to get on Shore, he comes to say, after that he had been 4 Days in Britain, the 18 Ships with his *Horse* put to Sea, and were come within Sight of his *Camp*, when a sudden Tempest arose, with Contrary Wind, so that some of the Ships put back again, others were Driven to the *Westwards*, not without great Danger, and coming to an Anchor, they found they could not *Ride* it out: So when Night came on, they put off to Sea, and returned from whence they came. The same Night it was *Full-Moon*, which makes the *Greatest Tides* in the *Ocean*; and they being Ignorant thereof, their *Gallies* which were Drawn on Shore, were filled by the *Tide*, &c. Then he says, That the *Day* of the *Autumnal Equinox* being at hand, after some Days stay, wherein there passed no Action, because he kept close in his *Camp* by the Shore; and not thinking it Proper to Stay till the *Winter* came on, he Returned into *Gallia*. The next Year he made a further *Expedition* with 5 *Legions* and a good Body of *Horse*: But there is little in the History thereof serving to our Purpose, excepting that he says, He set Sail from the *Portus Icius* about *Sun-set* with a Gentle S. W. Wind, *Leni-Africo profectus*; that about *Midnight* it fell Calm, and being carried away with the *Tide*, by the time it was Day, he found he had left *Britain* on the *Left Hand*; but then the *Tide* Turning, they fell to their Oars, and by *Noon* reached that Part of the Island where he *Landed before*, and came on Shore without Opposition; and then Marched up into the Country, leaving his Ships at Anchor in *Littore Molli & Aperto*.

Dion Cassius, speaking of the Landing of *Caesar*, says, ἡ μὲντοι καὶ ἡ ἰδέα προέχεν; that is, as I Translate it, But he *Landed* not where he intended, for that the *Britains*, Hearing of his Coming, had possessed all usual places of Landing, Ἀρξάν οὖν τινὰ προέχσαν περιπλεύσας ἐτέρῃσι παρεκομίδην. Κανταῦθα τοὺς προεμίξαντας οἱ ἐς τὰ τεύεσθαι ὑποβαίοντι νικήσας, ἐφθη τῆς γῆς κεκλήσας; in my *English*, Wherefore doubling a certain Head Land, he made to the Shore on the other side, where he overcame those that Skirmished with him at the *Water's Edge*, and so got well on Land.

From these *Data*, that it was in the Year of the *Consulate* of *Pompey* and *Crassus*; that it was *Exiguâ parte Aëstatis reliquâ*, and 4 Days before a *Full-Moon*, which fell out in the *Night-Time*; the Time of this Invasion will be Determined to a *Day*: For by the *Eclipse* of the *Moon*, whereof *Drusus* made so good use to Quiet the Mutiny in the *Pannonian Army*, upon the News of the Death of *Augustus*, it follows that *Augustus* Died *An. Chr. 14.* which was Reckoned *Anno Urbis Condite 767*; and that this Action was 68 Years before, viz. in the 55th Year before *Christ Current*. In which Year, the *Full-Moon* fell out *Aug. 30.* after *Midnight*, or 31 in the Morning before Day. The Preceeding *Full-Moon*, was *Aug. 1.* soon after Noon, so That this could not be the *Full-Moon* mention'd, as falling in the Day time: nor that in the beginning of *July*, it being not 10 Days after the *Summer Solstice*, when it would not have been said *Exiguâ parte Aëstatis reliquâ*. It follows therefore that the *Full-Moon* spoken of, was on

August

August the 30th at Night, and that the *Landing* on *Britain* was *Aug. 26*, in the Afternoon, about a Month before the *Autumnal Equinox*; which Agrees to all the Circumstances of the Story in point of *Time*.

As to the *Place*; the *High-Land* and *Cliffs* describ'd being allowed by all to be those of *Dover*, it only remains to examine, whether the Descent was made to the Northward or Southward of the Place where he first Anchored. The *Data* to Determine this, are 1st, That it was 4 *Days* before the *Full-Moon*. 2. That that Day by 3 of the *Clock* in the Afternoon, the *Tide* ran the same way he Sailed. 3. That a *S. by E. Moon* makes *High-Water* on all that Coast, the *Flood* coming from the *Southward*: Hence it will follow, that that Day it was *High-Water* there about 8 in the *Morning*, and consequently *Low-Water* about 2, wherefore by 3, the *Tide* of *Flood* was well Made up; and it is plain that *Cæsar* went with it, and the *Flood* setting to the Northward, shews that the *Open Plain Shore* where he Landed was to the Northward of the *Cliffs*, and must be in the *Downs*. A 2^d Argument is drawn from the *Wind* wherewith he set out on his second Expedition, viz. *S. W.* as appears by the Words *Leni Africo profectus*, with which the Navigation of these Times would hardly permit a Ship to sail nearer the *Wind* than 8 Points, or a *N. W.* Course; which would serve indeed to go into the *Downs*, but would by no means fetch the Lowland towards *Dengyness*, which is much about West from *Calais*, and not more than *W. N. W.* from *Boulogne*, if it shall be said, that that was the *Portus Icius* from which *Cæsar* set out. Whence I take it to be Evident, that if *Cæsar* was not bound more Northerly than the *South Foreland*, he could not have thought the *Africus* or *S. W.* Wind proper for his Passage, which was then intended for the Place where he First Landed the Year before.

Justly to determine which the *Portus Icius* was, I find no where sufficient grounds; only *Ptolemy* calls the *Promontory* of *Calais-Cliffs* by the Name of *Ἰκίον ἄλγεον*, whence there is reason to conjecture, that the *Portus Icius* was very near thereto, and that it was either *Ambleteuse* on one side, or *Calais* on the other. The same *Ptolemy* places *Γισσώπιον ἑννεύον* in the same Latitude with the *Ἰκίον ἄλγεον*, but something more to the East: Which seems to Refute those, that have supposed the ancient Port of *Gessoriacum* to have been *Boulogne*, whereas by *Ptolemy's* Position, it must be either *Dunkirk* or *Gravelingue*, but the former most likely, both by the distance from the *Ἰκίον ἄλγεον*, being about 20 Miles or half a Degree of *Longitude* to the East, or $\frac{1}{2}$ of the whole Coast of *Flanders*, which he makes but a Degree and quarter from the *Acron Icion* to the Mouth of the *Scheld*, which he calls *Ostia Tabudæ*; as also for that *Pliny* l. 4. c. 16. speaking of *Gessoriacum*, says the *Proximus Trajectus* into *Britain* from hence is 50 Miles, which is too much, unless *Gessoriacum* were something more Easterly than *Calais*. *Dion Cassius* makes the Distance between *France* and *Britain* 450 *Stadia*, or 56 Miles, and says likewise 'tis the nearest, *τὸ συντομώτατον*. But this is in part amended by the Explication given in the *Itinerary* of *Antoninus*, where the Space between *Gessoriacum* and *Rutupium* is laid to be 450 *Stadia*,

Stadia, (for this was the ordinary passage of the *Romans* into *Britain*,) *Rutupium* being more Northerly, and *Gessoriacum* more Easterly than the *Termini* of *Cæsar's* Voyage, and consequently the Distance greater than 30 Miles, which *Cæsar* had observed: and now lately an Accurate Survey has proved the Distance between Land and Land to be 26 *English Miles*, or 28½ *Roman Miles*, which shews how near *Cæsar's* Estimate was to the Truth.

A farther Argument (but not of equal Force with the former, because of the modernness of the Author, who writ above 150 Years after) may be drawn from the Words of *Dion Cassius*, where he says, Ἀχαιὶ τινὰ περὶ χύσαν πειπλύνσας ἐτέρῳσι παρικομίδῃ, that after his First Anchoring, he Sailed about a Promontory to the place where he Landed: Now there are no other Promontories on all that Coast but the *South-Fore-Land* and *Dengyness*; the latter of which it could not be, because *Cæsar* says he Sailed but 8 Miles, and the *Ness* it self is about 10 Miles from the South and nearest End of the Chalk-Cliffs by the Town of *Hith*; and to have gone round that Point to the other side, the Distance must have been much greater. So that the Promontory spoken of by *Dion*, must needs be the *South Fore-Land*, and *Cæsar* must needs Anchor near over-against *Dover*; from whence Sailing 8 Miles, he would double a Head-Land and come to the *Downs*; which is such a Coast as he Describes, in one place by *Apertum ac Planum Littus*, and in his 5th Book by *Molle ac Apertum Littus*.

As to *Dion's* Words ἐν τὰ τεράγῃ, which I have Translated, at the Waters edge, I have the Authority of *Suidas* for doing it, who says, τεράγῃ πηλῶν ἰλῶν, or the *Sca-mud*, and is therefore properly the *Ouse* on the *Sea-shore*. And the *Etymologists* Derive it from τέγῃ, *malesacio*, because the Wash and breach of the Sea does always keep it *Wet*. And this Word τεράγῃ is used by *Polybius* for the *Sea-Ouse*; and in another place he speaks of the Difficulty of Landing at the Mouth of a River διὰ τὴν τεράγῃν πηλῶν, ob *Limosum Accessum*; so that it is not to be doubted that it ought to be rendred in this place, ad *Vadum Maris*, rather than in *Paludibus*. And so this Objection against the Assertion that *Cæsar* Landed in the *Downs*, which is known to be a Firm Champain Country, without Fens and Morasses, will be remov'd; and the whole Argument will, 'tis hop'd, be admitted by the Curious.

IX. Here are found at *York* in the Road, or *Roman-Street* without *Mid-sel-gate*, and likewise by the River-side, where the Brick Kilns now are, Urns of 3 different Tempers. Viz. 1. Urns of a Blueish Gray Colour, having a great Quantity of Course Sand wrought in with the Clay. 2. Others of the same Colour, having either a very Fine Sand mixt with it full of *Mica*, or *Catsilver*, or made of Clay Naturally Sandy. 3. Red Urns of Fine Clay, with little or no Sand in it. These Pots are quite throughout of a Red Colour like fine *Bole*. Also many of those Red Pots are elegantly adorn'd with Figures in *Basso Relievo*, and usually the Workman's Name, which I think others have mistaken for the Person's Name Bury'd there, upon the Bottom or Cover; as *Janarius* and such like; but that very Name I have

5. 498.

Roman Urns
and other Antiquities
near
York; by Dr.
M. Lister, Ph.
Col. n. 4. p. 27.

Burton's C. Ant.
II. p. 183. 230.

have seen upon several *Red Pots*, found both here and at *Aldborough*. After all, these are Glazed inside and outside with a kind of Varnish of a bright Coral Colour.

The Composition of the *First* sort of Pots, did first give me Occasion to discover the *Places* where they were Made: The one, about the midway betwixt *Wilberfosse*, and *Barnby on the More*, 6 Miles from *York*, in the Sand Hills, or Rising Ground, where now the Warren is. The other *Roman Pottery* on the Sand Hills at *Santon*, not far off *Brigg* in *Lincolnshire*. In the *First* Place, I have found widely up and down broken Pieces of *Urns*, *Slagg* and *Cinders*: At the latter Place, there are yet remaining (though it is a Moveable Sand, and Hurry'd every Way by the Wind, and has by that means cover'd the Place all over) some of the very *Furnaces*, whose Ruins I take to be some of those *Meta* or Sandy Hillocks. Besides here are many Pieces of *Pots* and *Urns* of different Shapes, and much *Slagg* and *Cinders*; This *Pottery* having taken up much Ground, as to One that I shall diligently view the Place it will appear. 'Tis remarkable, that both the abovementioned *Potteries* are within less than a Mile of the *Roman-Road*, or *Military-High-Way*. I could not learn at either of those Places where any Clay for that Purpose was to be had near those Sands, which yet our *Modern Potteries* chiefly seek after, which has made them to be forgotten and disused.

The *Roman Urns* above describ'd Differ in these Particulars, from what Pots are now usually made amongst us. 1. That they are without all manner of *Glazing* with *Lead*, which perhaps is a Modern Invention. 2. That a far greater Quantity of Sand is used than Clay, which thing alone made it worth their while, to bring their Clay to the Sand-Hills. 3. That they were Baked either with more Leisure, after long and through Drying, or Inclosed within certain Coffins, to defend them from the immoderate Contact of the Flames: Which I am induced to believe, because there seem to be Fragments of such things to be found. 'Tis certain the Natural Colour of the Clay is not Altered by Burning: So that both the Degrees of Heat and manner of Burning might be Different. And one of these *Potsherds*, as I have heard, Baked over again in our *Ovens*, will become *Red*. As to the two last Kind of *Urns*, it is likely the *First* of them, with their Particles of *Mica* in it, were made of a Sandy Blue Clay, of which Nature there is Plenty among the Western Mountains in *Yorkshire*, and particularly at *Carleton*, not far off *Ickley* a *Roman Station*. The *Red Urns* seem to have been their Master-piece, wherein they shewed the Greatest Art, and seem'd to Glory most, and to Eternize their Names on them. I have seen great Varieties of Embossed Work on them. And lastly for the Elegant manner of *Glazing*, it was far Neater indeed, and more Durable than our Modern Way of *Leading*, which is apt to Crack and Craze, both with Wet and Heat; and at the Fire is certainly unwholesome, by reason of the Fumes *Lead* usually Emits, being a quick Vaporable Metal. This ancient *Glazing*, seems to have been done by the Brush, or Dipping; for both Inside as well as Outside of the *Urn* are glaz'd, and that before the Baking. And something of the Materials of it seems to be remembred by *Pliny*, *Fideli-*

lia ex Bitumine inscripta non delentur; The Painting of Pots with Bitumen is Indelible. And again, *Tingi solidas ex Bitumine Statuas*; The Bitumen, he says, Sinks into the very Stones and Pots, which is something more than Glazing. Lib. 35 c. 15.

The great Plenty of these Urns found in many Parts of England, seems to Argue them also of English Manufacture, but where I cannot guess, unless wrought at the *Bole-Mines*, of which Clay alone they seem to be made, in *Cleveland*; for that Barren Tract of Land call'd *Black-Moor*, was well known to the *Romans*, the Jet Rings taken up with these Urns do sufficiently testify. Now Jet and Bole are no where that I know of to be found with us in England but in that Tract; being Fossils peculiar to those Mountains. Of these Jet Rings some are Plain, and others Wrought, but all of them of an extraordinary Bigness, being at least 3 Inches Diameter, yet the inward Bore is not above an Inch and an Half, which makes them too little for the Wrists of any Man, as they are much too big for the Fingers. So that probably they were never worn either as *Armilla* or *Annuli*.

Being upon this Subject of Roman Clay-work, we cannot but take notice of the Opinion of *Cambden*, who will have the *Obelisks* at *Burrow-Briggs*, in this County, Artificial, when in truth they are nothing less, being made of one of the most common sorts of Stone, viz. of a Coarse Rag, or Millstone-grit; but without doubt, the Bigness of the Stone surprized him, either not thinking them portable, or perhaps not any English Rock fit to yield natural Stones of that Magnitude. But Roman Monuments, I suppose, none does doubt them, because pitch'd here by a very remarkable and known Roman Station, *Isurium*. And then consider what Trifles these are, compared with the least *Obelisks* at *Rome*. And as to the Rocks whence they might be hewn, there are many of that Stone near the River *Nid*, and upon the Forest of *Knarsbourg*; and a little above *Ickly*, (another Roman Station) within 16 Miles of *Burrow-Briggs*, there is one solid Bed of this very Stone, whose Perpendicular Depth only will yield *Obelisks*, at least 30 Foot long. And yet at *Rudstone* near *Burlington* in the *Yorkshire Woods*, full 40 Miles wide of these Quarries, is an *Obelisk* of the very same Stone, Shape, and Magnitude, of these before-mention'd.

But we cannot let this pass without Noting, That almost all the Monuments of the *Romans* with us, were of this sort of Stone; As the Ancient Walls of this City, as appears by what remains of the Ancient Gates, and the great Quantities of it that is Wrought up in most of the Churches, and is still daily dug out of Foundations: but a most undeniable Instance is, a vast Roman Head, perhaps of some of the Emperors, upon a Neck or Square Pedestal of one solid Stone, with the Point of the Square to the Eye, of as Coarse a Grit as that of the *Obelisks* above-mention'd. This Stone is now in Mr. Hilliar's Garden, and was Dug out of the Foundations of some Houses thereabouts. The only remaining Inscription that I could find at *Burrow-Briggs*, yet Imperfect as well as Odd, is upon this sort of Stone in the Street-Wall of Sir William Tanker's House. Also two Roman Altars I have seen of this Stone; one, the Original of that at *Ickly* mention'd in

The Obelisks at Burrow-Briggs. not Artificial but natural Stones. 1b. p. 90.

Other Roman Antiquities, 1b.

Fig. 4.

Cambden; another in the Possession of that Learn'd Antiquary Mr *Thoresby*, late of *Leeds*. And this I think sufficient to disprove that Mistake of *Cambden*, That the Stones of *Burrow-Briggs* are *Artificial*. There is but one only Instance that I ever yet met with of the *Romans* ever having used in these Parts of *England* any other sort of Stone; yet it is not the Common Limestone, but a certain sort of Stone had from the Quarries about *Malton*, because of the *Lapides Judaici*, by me formerly describ'd, to be seen in the Texture of it. It is a small but Elegant Altar with Figures, in *Basso Relievo*, of Sacrificing Instruments, &c. It has suffer'd an unlucky Accident by the Stupid Ignorance of the Mafons, who were Order'd by the late Lord *Fairfax* to place it upon a Pedestal in the Court of his House at *York*, yet the Inscription was by chance preserv'd.

vid. v. l. 11.
Cap. 111.

Fig. 5.

n. 145. p. 73.

I have also met with a large Pedestal of the same Coarse Ragg, found deep in the Ground, on the West side of the River, which, by the Stone and its Mouldings, was undoubtedly *Roman*, and must have been for a Pillar in some Large Building.

There is a broken *Inscription* in the Church-Wall in *All-Saints North-Street*, with the Figure of a Naked Woman in *Basso Relievo* on the Left side of it. The Letters (as many of them as remain) are exceeding fairly Cut, beyond any thing I have yet seen of *Roman Antiquities* in *England*, and the Stone is of a Finer Grain than Ordinary. It is a Monument of *Conjugal Affection*. The First Stroke, is the out-side of a great M, and is part of the *Dis Manibus*. The 3 last Lines may be Read thus, *Benè merenti Antonio Conjugi*: yet it is hard to say, whether it was for the Husband or Wife, for it may be Read *Antonia*. The Points also betwixt the Words are here very Singular, but this was the Caprice of the Stone-Cutter, who sometimes also uies a Leaf, Hanging or Erect, a Hand, a Feather, or such odd Fancy, for Points.

Fig. 6.

A Roman Pottery near Leeds;
by Mr. Ralph
Thoresby, n.
222. p. 319.

X. I have lately discover'd a *Roman Pottery* upon *Blackmore*, about 2 Miles from *Leeds*, (the Old *Legeolium*.) The Name *Hawcaster Rigg* gave me the first Occasion to hope for some *Roman Ruins* there; but instead of the Remains of a *Regular Camp* or *Fortification*, I was surpriz'd to find several Rounds, or Circular Heaps of Rubbish, abundantly too small for any *Military Use*; One by the Wheel, was 16 *Perches* round; another in Walking, 76 *Paces*: and these I take to be the Ruins of some of the very *Furnaces*; 'tis a *Sandy Ground*, yet Plenty of *Clay* at no great Distance. The Country-People tell me of Heaps of *Slagg* and *Cinders*, but I had not the hap to meet with any, the place being grown over with Moss, &c. I am ready to fancy these might be for their *Bricks*, because of the great Plenty of *Clay* in the Neighbourhood, and the great Number of those *Roman Bricks*, yet to be seen in the Ruins of *Kirkstall-Abbey*: and that it belonged to the *Romans*, I conclude, because it is Seated upon a Branch of the *Roman Way*, or one of their *Via Vicinales*, that Leads from the Great *Military Road* upon *Bramham-Moor*, by *Thorner*, *Shadwell*, and *Kirkstall* to *Cambodunum*. Besides, the very Name seems to import some *Roman Castrum*

Castrum near the adjoining Eminency that the Saxons call'd *Haws* or *Houghs*; and the Word is yet retain'd in some parts of *Yorkshire*, witness *Hamleton-Hough* in the Road to *Selby*. And to conclude, the Village that succeeded the *Old Pottery*, is call'd *Potter Newton*.

XI. *Vitruvius* tells us, that the Romans anciently let their Bricks stand to Dry a whole Year, sometimes longer, before they were Burnt: and 'tis observable that those stupendious Remains of that Ancient Amphitheatre of Roman-work, being all Bricks, near *Bourdeaux*, are still as Firm as a Rock, excepting such places as the Rains and Storms have spoil'd, by getting in at top: Which may also be seen in divers other old Structures in *Italy*, *France*, and elsewhere.

The Excellency of Roman Bricks, and Plastering; by n. 93. p. 6010.

Their Plastering also to this Day, where it hath not met with Violent Knocking or Breaking, is to be seen as free from Cracks or Crevices, and as Smooth and Polisht, as if it were Marble: Witness their *Aqueducts*, whose bottom and sides were thus Plastered; and particularly that, whereof some Yards are still to be found on the top of *Pont de Gare* near *Nismes*, for the support of which that Famous Bridge was built to carry Water to the said Town.

XII. An Old Earthen Vessel was lately found at the Brick-kilns without *Bowthant-Bar*, near *York*: and is preserv'd in the *Museum Ashmoleanum* at *Oxford*. It is suppos'd by some to be an *Urn*, by others to be a *Flower-Pot*. The Clay is of the Colour of *Hallifax-Clay* when Burnt; the Potter's part is well perform'd, the Face being Bossed from within with the Finger, when upon the Wheel; and some Strokes of Red Paint, about the Curls of the Hair, and Eye-brows; and Two Red Threads about the Neck. On the backside of the Vessel, a Leaf is drawn in Red, which is still very fresh; but no Glazing, neither upon the Clay nor Red-Colour; the Face upon the Vessel is as large as that of a Middle-sized Woman.

An Old Earthen Vessel found near York; by n. 171. p. 1017.

XIII. Carefully Viewing the Antiquities of *York*, the Dwelling of at least Two of the Roman Emperors, *Severus* and *Constantine*, I found a part of a Wall yet standing, which is undoubtedly of that Time; it is the South-Wall of the *Mint-yard*, being formerly an Hospital of *St. Lawrence*, looking towards the River: It consists of a *Multangular Tower*, which did lead to *Botham Barr*, and about — Yards of a Wall, which ran the length of *Coring-Street*, as he who shall attentively view it on both sides may Discern.

A Roman Wall and Multangular Tower at York; by Dr. M. Lister. n. 149. p. 235.

The Outside, towards the River, is faced with a very small *Saxum Quadratum* of about 4 Inches thick, and laid in Levels like our Modern Brick-Work: but the Length of the Stones is not observ'd, but are as they fell out in Hewing. From the Foundation 20 Courses of this small Squared Stone are laid, and over them 5 Courses of Roman Brick; these Bricks are laid some length-ways, and some end-ways in the Wall, and were call'd *Lathes Diatoni*: After these 5 Courses of Brick, other 22 Courses of small Square

H h h 2

Stone

Stone (as before describ'd) are Laid, which raise the Wall — Feet higher; and then 5 more *Courses* of the same *Roman-Bricks* are overlaid, beyond which the Wall is Imperfect, and Capt with *Modern Building*. Note, that in all this Height there is no *Casement* or *Loop-hole*, but one Entire and Uniform Wall, from which we guess the Wall to have been Built some *Courses* higher after the same Order. The *Bricks* were to be as *Thoroughs*, or as it were so many new Foundations to that which was to be Superstructed; and to Bind the two Sides together firmly; for the Wall itself is only Faced with small *Square Stone*, and the Middle thereof filled with *Mortar* and *Pebble*.

Vitruvius commends *Brick-Building* before *Stone* even for the Duration: and therefore to excuse it, he gives a Reason why the *Romans* suffer'd not *Brick-buildings* to be made within the City of *Rome*, as a thing not of Choice, but Necessity. The *Law* (says he) suffers not a Wall to be made to the *Streetward* (for so give me leave to interpret *communi Loco*) above a Foot and a Half thick, and *Partition Walls* the same, least they should take up too much *Room*. Now *Brick-Walls* of a Foot and a half thick (unless they were *Diplinthii* or *Triplinthii*) cannot bear up above one Story. And therefore when a Plain *Area* or Building of one Story, could not receive such a Multitude to dwell in the City, the Houses of Necessity were Raised Higher, and they had strange Contrivances of out-jetting, and over-hanging Stories, and *Balconies*, &c. Which Reasons, if rightly considered, are great Mistakes: Our Men at this Day have Demonstrated that a firm Building may be raised to many Stories height upon a Foot and a half thick Wall. The oversight of the *Romans* was the vast Bigness of their *Brick*, for the lesser the *Brick* the firmer the Work; there being much greater Firmness in such a vast multitude of Angles, as must be produced by a small *Brick*, than in a Right Line; and this is the Reason of the Strength of *Buttresses*, and *Multangular Towers*, &c.

Those *Bricks* are about 17 *Inches* of our Measure Long, and about 11 *Inches* Broad, and 2 *Inches* and a half Thick. This (having caused several of them to be carefully Measur'd) I give in Round Numbers, and do find them to agree very well with the Notion of the *Roman Foot*, which the Learned Antiquary *Graves* has left us; viz. of its being about *Half an Inch Less than Ours*. They seem to have shrunk in the *Baking*, more in the Breadth than in the Length; which is but Reasonable, because of its easier yielding that way: and so for the same Reason, more in Thickness; for we suppose them to have been Designed in the Mould for 3 *Roman Inches*. This Demonstrates *Pliny's* Measures to be True, where he says, *Genera Laterum tria*; *Didoron*, *quo utimur*, *longum* Sesqui-Pede, *Latum* Pede; and not those of *Vitruvius*, as they are extant: The Copy of *Vitruvius* where it describes the Measures of the *Didoron* being vitious. And indeed all that I have yet seen with us in *England* are of *Pliny's* Measures; as at *Leicester* in the *Roman Ruin* there, call'd the *Jews Wall*; and at *St. Albans*, as I remember, as well as here with us at *York*: So that the *Single Brick-wall* was only allowed as Standard, viz. a Foot and a half Thick Wall, or one *Roman Brick*

^a length. And therefore it is but reasonable we should make *Vitruvius's Longum Pede, Latum Semipede*, a fault of *Vitruvius's* Coppiers.

I shall only Add this Remark, That *Proportion*, and a Plain *Uniformity*, even in the Minuteſt parts of Building, is to be obſerv'd; as this miſerable *Ruin of Roman Workmanſhip* ſhews. In our *Gothick Buildings*, there is a total neglect of the Meaſure, and Proportion of the *Courses*: As tho' that was not much material to the *Beauty* of the whole; whereas indeed in Nature's Works it is from the *Symmetry* of the very Grain, whence ariſes much of the *Beauty*.

XIV. I have added to my *Roman Curioſities* Two entire *Urns*, both of the *Blueiſh-Gray-Clay*, but of Different Forms, with ſome of the *Burnt Bones*: and Two other Veffels of *Red-Clay*; the Leſſer of them is almoſt in the Form of the *Roman Simpulum* or *Guttus*, and by the Narrowneſs of the Neck ſeems rather to have been a kind of *Lacrimatory*, or Veffel for ſome kind of *Liquid Matter*, rather than *Aſhes*; the Other was part of an *Aqueduct*, and is turned in the form of a *Scrue* on the Inſide, and has a narrow Neck at One End, to put into the Open End of the Next, and ſeveral of theſe (each a *Foot* Long and 4 *Inches* Broad) were found thus placed in the *Roman Burying Place* at *York*, by the River-ſide, out of *Boutham Bar*, which our Learned Dean, Dr. *Gale*, tells me ſignifies *Burning* in the *British Language*, and 'twas Indisputably the Place the *Romans* made Uſe of to that End, as appears by the great Number of *Urns* there frequently found, when they Dig the *Clay* for *Bricks*. And that it Continued the place of their *Sepulture* after that Cuſtom of *Burning*, introduced in the Tyrannous Dictatorſhip of *Sylla*, was aboliſhed, is Evident by a remarkable *Hypogeum* without any *Urns* in it, diſcovered the laſt Winter 1696; 'twas large enough to contain Two or Three *Corſes*, and was *Paved* with *Bricks* nigh Two *Inches* thick, eight in Breadth and Length, being Equilaterally Square, upon which was a Second *Pavement* of the ſame *Roman Bricks* to Cover the Seams of the Lower, and prevent the working up of *Vermin*. But thoſe that Covered the *Vault* were the moſt remarkable that ever I ſaw, being about Two *Foot* ſquare, and of a proportionable Thickneſs. I have alſo a 3d ſort of *Roman Bricks*, which I diſcovered in the Ruins of *Kirkſtal-Abbey*, two Miles from *Leeds*, which come the neſteſt thoſe mentioned by *Vitruvius*, being 8 *Inches* broad, and almoſt Double the Length. I have alſo Two ſorts of *Chequered Pavements*; one of about 3 *Inches* ſquare, the other (of thoſe found at *Aldborough*) not above half or one 4th of an *Inch*, and of Different Colours.

Several Roman Antiquities about York and Leeds; by Mr. Thoresby. n. 234. p. 738.

XV. I have procured part of the Bottom (which conſiſted of ſeveral ſuch Pieces for the conveniency of *Baking*) of an old *Roman Coffin*, that was lately dug up in their *Burying Place* out of *Boutham-Bar* at *York*. 'Tis of the *Red-Clay*, but not ſo Fine as the *Urns*, having a greater quantity of Coarſe Sand wrought in with the *Clay*. As to the Form (which is entire as it was firſt Moulded) 'tis 14 *Inches* and a half Long, and about 11 Broad,

A Roman Coffin and other Roman Antiquities and Cores; by Mr. Ralph Thoresby. n. 244. p. 312.

Broad, at the Narrower End, and nigh 12 and a half, at the Broader; This was the Lowest part, for the Feet, and the rest were proportionably Broader till it came to the Shoulders; 'tis an Inch thick besides the Ledges, which are one Broad and Two Thick, and extend from the bottom of either Side to within 3 Inches of the Top, where 'tis wholly Flat, and somewhat Thinner for the next to lye upon it; which Several parts were thus joyn'd together by some Pin, I presume, for at the End of each Tile is a Hole that would receive a common Slate-Pin. These Edges are wrought a little Hollow, to receive the Sides, I suppose, and at the Feet are two contrary Notches to fasten the End-piece. This Bottom I should conclude to have consisted strictly of 8 such Parts, from a like Character 8 Impress upon the Clay by the Sandapilarius's Finger before its Baking, but that I somewhat doubt whether Numeral Figures be of that Antiquity in these European Parts. I got also some Scars of Broken Urns, dug up in Mr. Giles's Garden, which are of the Finest Clay I have seen, with which was found a Roman Shuttle, about 3 Inches and an half Long, but not one Broad in the very Middle: the Hollow for the Lignum being but one 4th of an Inch in the broadest place, shews that it was either for Silk or very Fine Linen, perhaps their Asbestinum or Incombustible Winding Sheets. I have also lately Procured a Roman Pottle from Aldbrough, which is of the Red-Clay, but much Coarser than the York Urns: I take it to be strictly the Half of their Congius, and comes the highest Mr. Greaves's Computation, containing 3 Pints and an Half the Winchester-Measure.

I have received 22 Old Roman Coins, from Mr. Townely of Townely, which were lately found in the Parish of Burnley in Lancashire. Many of them are Consular, or Family Coins, one of them, viz. Q. Cassius, was 162 Years ante Christum according to Goltzius's Method, being strictly the same he places A. U. C. 589. That they were the ancient Roman Denarii, and Coin'd before the Emperors Times, (notwithstanding the contrary Sentiments of some Learned Men) I think is Evident; because there is mostly, instead of the Emperor's Head, the Antick Form of the Caput Urbis, without Inscription; besides, Tacitus calls these Bigati and Quadrigati, Pecuniam Veterem ac Diu notam; Again, others have upon them ROMA, which I find not used by any of the Emperors, (except those small Pieces upon the Translation of the Empire to Constantinople;) again, the Letters in these are often interwoven, as particularly V—L in one I have of L. Valerius Flaccus. A. U. C. CDXCII, which, according to Goltzius, is the 7th Year after the Romans first Stamp'd Silver Monies; and to mention no more, many are of the Serrato's filed in small Notches round the Edge, of which sort I have some of Scipio Asiaticus, &c. and other Consular Pieces; but I never saw any of a Later Date.

A Roman Pavement near Roxby, by Lincolnshire, by M. Abr. de la P. 1700. p. 565.

XVI. Aug. 1. 1700, I went with Mr. Place and Mr. Nevil of Winter-ton, to Roxby, (a little Town on the West of the Famous Roman Way which runs from Lincoln to the Humber side) to view a Roman Pavement lately discovered there by one Tho. Smith, as he was digging to repair a Fence. The

The

The Close, or Garth, where this piece of *Antiquity* is found, is in the Town on the South-West of the Church. We bared about a Yard and half square, in doing which we cast up many pieces of *Roman Tile*, the *Bone* of an hinder Leg of an Ox or Cow, broken in two, and many pieces of *Plaster* Painted *Red* and *Yellow*, which seemed to have been the *Cornish* at the Foot of some *Altar*, or else perhaps of some part of the *Building*; and we observed that several great Stones in their Falling (when the Building over this *Pavement* was Destroyed) had broken and lodged themselves in the *Pavement*, and there lay until we removed them. The *Pavement* it self looked exceeding *Beautiful* and *Pretty*: and yet the *Stones* which Composed it were nothing but Small four Square bitts of *Brick*, *Slate*, and *Cauk*, set in curious *Figures* and *Order*, and are only of 3 Colours, *Red*, *Blue*, and *White*. The Material that these small *Stones* is set in, is a Floor of *Lime* and *Sand*, and not *Plaster*. The whole *Pavement* consists of *Circles*, and *Quadrangular*, and many uneven *Figures*, with *Rows* of the aforesaid *Stones*; in some of which *Circles* and *Figures* were *Urns*, in others *Flowers*, in others inter-changeable *Knots*, according as the Workman Pleased.

XVII. I have got into my hands a very large and fair *Roman Altar* of One Entire Stone, which was but a very few Years ago Discovered upon the South Bank of the River *Tine*, near the *Sheilds* in the *Bish.* of *Durham*. The Stone it self is of a coarse *Ragg*, the same with that of the *Pyramids* at *Burrow-Briggs*. It is 4 Foot high, and was ascended to by *Steps*, which appeareth in that all the Sides, but the *Front*, have two square Holes near the Bottom, which let in the *Irons* that joyn'd it to the *Steps*.

A Roman Altar by Dr. M. Lister, n. 145. p. 70.

On the Backside, opposite to the *Inscription*, is Engraven in *Basse-Relief* a *Flower-Pot* furnished, I suppose, with what pleased the *Stone-Cutter*: for these Men needed not to be more Curious than the *Priests* themselves, who were wont to make Use of Herbs next Hand to Adorn the *Altars*; and therefore *Verbena* is put for any kind of Herb. Yet if we will have it resemble any thing with us, I think it most Like, if not Truly, *Nymphaea*, a known and common *River-Plant*. On One of the Sides, which is somewhat narrower than the *Front* or *Back*, are Engraven in *Bass-Relieve*, the *Cutting-Knife* (*Cesepita*) and the *Ax* (*Securis*.) The *Knife* is exactly the same with that on the other *Altar* mentioned above: but the *Ax* is different; for Here it is Headed with a Long and Crooked Point, and there the Head of the *Ax* is Divided into 3 Points. On the Other Side are engraven after the same manner an *Eure* (*Urceolus*) and a *Ladle*, which serve for a *Sympullum*. This I call rather a *Ladle*, than a *Mallet*, it being perfectly *Dish-wise* and Hollow in the Middle; altho' *Camben* is of another Opinion in that elegant Sculpt of the *Cumberland-Altar*. And the very same *Utenfil* I have seen and noted on the *Ickley Altar*, which is yet extant at *Middleton Grange* near that Town. The *Plane* of the Top is Cut in the Figure of a *Basin* (*Discus* or *Lanx*;) with *Anse* on each side, consisting of a pair of *Links* of a *Chain*, which rest upon, and fall over two *Rowles*; and this was the *Hearth*. The *Front*, hath an *Inscription* of 9 Lines in

Fig. 7.

Fig. 8.

Vid. Sup. Sect. IX.

Fig. 9.

Fig. 10.

Fig. 11.

Roman

Roman Letters, each Letter a very little more than two Inches deep of our Measure, now Remaining as in the *Sculpture*; which I would Read thus, *Dis Deabusque Matribus pro Salute M. Aurelii Antonini Augusti Imperatoris-- Votum Solvit lubens lubens merito ob Reditum.*

The *Dea Matres*, are well interpreted by *Selden*. It is much his *Safety* and *Return*, both Vow'd, should be so separated in the *Inscription*. *Caracalla*, say the *Historians*, after his *Father's Death* at *York*, took upon him the *Command* of the *Army Alone*, and the whole *Empire*; He went *Alone* against the *Enemy*, who were the *Caledonii* Inhabiting beyond the *Wall* which his *Father* had Built. He made *Peace* with them, Received their *Hostages*, Slighted their Fortify'd Places, and Return'd. And this seems to be Confirm'd by the *Inscription*; for undoubtedly upon this last Expedition of him *Alone*, without his *Brother Geta* and *Mother*, was this *Altar* Erected to him *Alone*, at a Place about 2 *Stations* on this side the *Wall*. So that the Vow might be as well understood of his *Return* from this Expedition, as for his *Safety* and *Return* to *Rome*; which methinks should be True, or his *Mother* and *Brother Geta* would scarce have been left out, at least so early. For yet the *Army* declared for them both, according to their *Father's Will*.

Further, it seems also to have been Erected by those who flattered him, and who were afterwards Kill'd by him; and for this Reason the *Persons Names*, who Dedicated it, seem to me to be Purposely defac'd, the 6th and 7th Lines of the *Inscription* being designedly Cut away by the *Hollowness* of them, and there not being the least Sign of any Letter remaining, and this I suppose might be part of their *Disgrace*, as it was usual to deface and break the *Statues* and *Monuments* of *Persons Executed*, of which this *Monster* made strange Havock.

There is another Reading of part of the two first Lines, which I do not Disallow, but that it will Agree well enough with the *History* of *Severus*, tho' his *Apotheosis*, or Solemn Deification, was not perform'd till he came to *Rome*, in the Manner of which *Funeral Pomp*, *Herodian* is very Large; it was of that excellent Antiquary Dr. *Johnson* of *Fomfret*. CONSERVATORI. B. PROS, &c. as it follows in Mine: Which shews the Height of Flattery of those Times. So that they paid their Vows to the lately Dead Father the *Conservator* of *Britain*, for the *Safety* of the *Son*; and the Story tells us how gladly he would have had him made a *God* long before, even with his Own Hand.

XVIII. Dr. *Cay* of *Newcastle* has sent me the Copies of two *Roman Altars*. The former of them was taken out of the *Roman Wall* not far from *Collerton*, or *Chollarton* †, and may tempt us to believe that the Old *Procolitia*, which was the Station of the *Cohors prima Batavorum*, was rather There, which is an Important Place, (where the River *Tine* interrupting the

Two Roman
Altars in Nor-
thumberland;
by Mr. Ralph
Thoresby. n.
p. 663.
Fig. 12.

† Prope Collerton Cilurnum. Notitia Dignitatum Imperii; est tamen Procolitia alius locus a Cilurno.

Course of the Wall, it was but necessary that the Ford should be Secured by making one of the Cohorts keep that Station, and 'tis but 2 Miles and a half from Carrow, (where the Altar now is in the Possession of Mr. Forster) than at Pruddow, which is at least 10 Miles Distance from where Mr. Cambden seem'd to Fancy it. The other is at Blenkinsop (a) Castle in Northumberland, which I take to have been Dedicated by Lucius Annius to the Goddesses Nymphs, Old and Young, and particularly to the Debonair (if Urbana be taken appellatively) Mansueta Claudia; for thus I Read it, DEABVS NYMPHIS Veteribus ET Junioribus MANSUETAE CLAUDIAE VRBanae, Nuncupavit Hoc Lucius Ann IVS; and thereby the Defects in the Stone seem to be supply'd with a right Number of Letters in each Vacuity.

Fig. 513.

(a) Prope B'len-
kin sop & Wi-
den Vettis. Circa
hanc Loca Fone-
tes utrum ne
nomen hoc in-
dicat.

XIX. Dr. Lister, in the Year 1683, exactly Designed the Roman In-
scriptions, Fig. 14. 15. 16. 17. 18. 19. 20. according to the Orig-
inals now to be seen at Bath in Somersetshire. The Letters of Fig. 15.
16. 17. are 5 Inches Compleat.

Some Roman
Inscriptions by
Dr. M. Lister.
n. 155. p. 457.

Fig. 21. contains the Inscription of an Altar found near the Roman Camp,
which is placed within the Angle where the 2 Rivers Medloe and Erwin
Meet, a little Mile S. W. of Manchester in Lancashire, and Preserved in
the Garden of the Worshipful Edw. Mosely de Holme, Armiger.

Fig. 14. 1. 1.
17. 1. 19. 20.
Fig. 21.

XX. Oct. 26. 1696. I got a Sight of an Altar-piece, Dug up at Chester,
about 3 Years since, and is now in the Custody of one Mr. Prescott.

The following Inscription thereof is pretty Entire, but Roughly Cut in
the Stone of the Place (b), which is Soft and Mouldring, nor capable of
Long Continuance when it is Exposed to the Air.

A Roman Al-
tar at Chester;
by Mr. Edmund
Halley. n. 222.
p. 316.
(b) Vid. Sup.
Vol. II. Cap. III.

PRO. SAL. DOMIN

-----IM NNINVI

CTISSIMORVM

AVGG. GENIOLOCI

FLAVIVS LONG — I suppose VS there not being

TRIB. MIL. LEG XX. Room for INVS.

LONGINVS FLA

VIVS DOMO

SAMOSATA

V. S.

By the Title of *Domini nostri* given to the Emperors, it appears that this
Inscription was of the Bas Empire, not before Dioclesian, nor yet so late as
Theodosius, it being Pagan. The Stone it self is about 32 Inches High, 16 in
breadth, and 9 Thick; On the One End is Engraven, not very Curiously,
the Resemblance of a Genius, holding a Cornu Copia; on the Other is a
Vol. III.

l i i

Flower-

Flower-Pot somewhat better Perform'd, but a little Endamaged by the Softness of the Stone. The Backside, Opposite to the *Inscription*, is adorn'd with a pretty sort of *Feuillage*, designed to fill up the Vacant Space. On the Top, in a pretty deep Cavity, is a full Face of a Man, almost such as they Paint the *Sun* or *Full-Moon* withal, with a Cap upon his Head, of which as yet I cannot comprehend the Design.

Some Roman
Inscriptions
found near
Durham, by Mr.
Chr. Hunter,
n. 266 p. 657.
Fig. 22.

XXI. These *Inscriptions* were found near to a Village call'd *Lancaster*; about 5 Miles North West from *Durham*, which I am fully perswaded has been the *Longovicum* of the *Romans*. This Place has been a very considerable Place in these Parts, and their *Watling-street* lies through it. 'Tis on the top of a Hill, which has a Descent on Three Sides; Towards the West it is over-look'd by a High Hill, and almost Eastward from it about a Quarter of a Mile, stands the present *Lanchester*, a Tolerable Country Village, with a pretty Church, which before the *Reformation* was Endow'd with a *Deanery* and 6 *Prebends*. The Form of this Place has been Square, and Fortify'd with a Thick, Strong, Stone Wall Faced with Hewen Stone. Within the Wall are (and have been formerly) nothing but ruinous Heaps of Stones; as also without the Wall too, especially towards the East. 'Tis probable the Buildings Within the Wall have been all publick, such as the *Station*, for the *Soldiers*, *Temples*, *Palaces*, &c. or (which I am more inclin'd to think) there has been nothing but the *Lodging* of the Garrison Within the Wall. This I rather suppose, because the *Inscription* of *Gordianus* was not found here, but about a Hundred Yards from the Wall towards the East, near which Place the Largest Stones are found: and I my self above a Year ago found part of a Large *Earthen Urn*, near this Place, within which I suppose there had been a Lesser, such I remember was found at another Village not far from this, which I am perswaded has been another *Colony*. There is no doubt but this *Colony* has been Adorned with many Beautiful *Palaces*, and other Sumptuous Buildings; and perhaps the *Balneum cum Basilica*, mention'd in one of these *Inscriptions*, has been That so long in vain sought for at *Rome*.

Some Roman
Coins; by Mr.
Ralph Thoresby
n. 241. p. 208.

XXII. I have procured some of the *Roman Coins* lately plough'd up about *Nottingham*; but they prove Common, and most of *Tetricus*, tho' some also of *Gallienus*, *Victorius*, and *Claudius Gothicus*.

Molds for Coin-
ing, or Counter-
feiting Roman
Money; by Mr.
Thoresby. n.
234 p. 739.

XXIII. Mr. *Clark* (the *Lady Cambden's* Lecturer at *Wakefield*) has brought me some very fair *Coins*, or rather *Impressions* upon *Clay*, which he rescu'd from some Labourers, who, in delving in the Fields near *Thorp on the Hill*, found a considerable Number of them. At first we could not imagine for what Use they were Design'd, but upon a stricter View, it appears plainly, they were for the *Coining*, or rather *Counterfeiting*, of the *Roman Monies*, that Wretched Art it seems being in Vogue 1500 Years ago, for they are indisputably of that Antiquity, and are really very dexterously done. They have Round the *Impression* a Rim, about half the Thickness of the *Roman Silver*

Silver Penny, in each of which is a little Notch, which being joyn'd to the like Nick in the next, makes a round Orifice to pour in the Metal. Each of these has either Two *Heads*, or as many *Reverse*s; so that placing one, for Example, with *Alexander Severus's Head* on one side, and his Mother *Julia Mamaea's*, on the other, betwixt two pieces with *Reverse*s, it compleats both; so that one with *Heads*, and another with *Reverse*s, are placed alternatim for a considerable Length, and then all pasted over with an outer Coat of *Clay*, to keep the Metal from Running out, and a little Ledge on either side the Orifice, to convey the Metal into the long Row of Holes. They are all of *Emperors* about the same Age, when indeed the *Roman Moneys* were notoriously Adulterated, as is observable in any Collection of their *Coins*, though some of them Now are so Scarce, particularly a *Duodumenianus*, that I Question whether this Age can Produce One to take a Copy of.

XXIV. The Ancient *Romans* had Three Words *Scutum*, *Parma*, and *Clypeus*, for that Defensive Weapon we generally *English* a *Shield*, which notwithstanding their different Forms or Matter, their Authors (especially in the Declension of the *Empire*) frequently Confound, as, if I mistake not, we do *Shield*, *Buckler* and *Target*. Of these *Shields* or *Bucklers* I have One of the *Parma* kind, and rightly so call'd, *quod è Medio in omnes partes sit Par*; whereas the *Scutum* was mostly *Oval*, tho' sometimes *Imbricatum*, with Corners equally broad; it is 15 *Inches* Diameter, whereof a little more than a 3d part is taken up with the *Umbo*, or protuberant Boss at the Navel, which is made of an Even Convex Plate, wrought Hollow on the Inside, to receive the *Gladiator's* Hand; upon the Center of This is a Lesser Boss, wherein there seems to have been fix'd, some kind of *Cuspis*, or sharp Offensive Weapon, to be used when they came to fight Hand to Hand, but the Form of this I cannot describe, both my *Shields* being Defective in that Point. From the said *Umbo* the *Shield* is 4 *Inches* and a half broad on each side, in which are 11 Circular Equidistant Rows of *Brass Studs* of that Size, that 222 are set in the utmost Circle, which is 4 *Foot* wanting 3 *Inches*, (for that is the *Circumference* of the *Buckler*) and so proportionably in the Lesser Circles, to the Center of these 11 Rows of *Brazen Studs*. The Inmost Circle is placed upon the *Umbo* it self, the next 8 upon as many Circular Plates of *Iron*, each a 3d of an *Inch* Broad. The two Outermost upon One Thicker Plate an *Inch* broad. In the little Intervals between these Circular Plates are plainly discovered certain *Cross Lamina* that pass on the Back of the other, from the *Umbo* to the Exterior Circle; and these *Iron Plates* are also about the 3d part of an *Inch* at the broader end towards the *Circumference*, but gradually Contracted into a narrower breadth, that they may be brought into the Compass of the *Umbo* at the Center. The Inner Coat next to those *Iron Plates* is made of very Thick, Hard, Strong *Leather*, which cuts Bright, somewhat like *Parchment*. Upon that is a second Cover of the same, and on the Outside of this are Plaited the *Iron Pins* that run through the *Brass Studs*; for the above-mention'd *Brass Studs* are Cast pure-

A Roman
Shield; by Mr.
Thoresby. n.
248. p. 205.

Fig. 23.

ly for Ornament upon the Heads of the said *Iron Pins* the 6th part of an *Inch* long, that none of the *Iron* appears. The next Covert to the plaiting of the said *Nails* (which pass through the Circular and Cross *Iron Plates*, and both the *Leather Covers*) is a pure Linen Cloth, but Discoloured, though perhaps not with Age only, but Sower Wine and Salt, or some other Liquid, wherein it seems to have been steeped. And lastly, upon the said Linen is the outmost Cover, which is of softer *Leather*. All which Coats that compose the *Shield*, are bound together by two Circular Plates of *Iron*, a Thin and Narrow one towards the Center, and a Thicker and Large one, an *Inch* Broad, at the Circumference; which is curiously Nail'd with two Rows of very small Tackets, above 400 in Number, the vacant Holes, whence some of the *Nails* are dropt out, are little bigger than to admit the Point of a pair of small Compasses; both which *Rims* do likewise fasten the *Handle* (the Only Part of Wood) which has also 6 other *Iron Plates*, about 3 or 4 *Inches* Long, to Secure it.

I lately procured another *Shield*, which differs from This not so much in *Size* (though it is compleatly a Foot Larger in the Circumference) as in the *Form*: For whereas This already Describ'd is almost *Flat*, except the swelling *Umbo*, This is absolutely *Concave*, and from the Skirts of the Protuberant Bos in the Middle it rises gradually to the Circumference, which is nigh 3 *Inches* Perpendicular from the Center; This has 14 Rows of the like Brass *Studs*, but the Circular Plates of *Iron* they are fix'd in, do not lie upon other Cross Plates, as the former does, but each from the Center, upon the Outer Edge of the other, which occasions its Rising in that *Concave* manner.

That These were part of the Accoutrement of the *Roman Equites*, rather than either the *Velites* or *Hastati*, I conclude, because that, though all in General had *Shields*, yet those of the *Velites*, who were as the *Forlorn Hope*, seem more Slight, and are expressly said to be, *è Ligno Corio superinducto*; those of the *Hastati* are not only said, *è pluribus Lignis & Asserculis consti*, &c. but were also 4 Foot Long, to Cover the whole Body, when stooping; of which kind were likewise those of the *Principes* and *Triarii*. Whereas the Description that the Anonymous Author of *Roma Illustrata* with *Fabricius's* Notes, gives in his *Armatura Equitum*, comes the highest this, *Scutum sive Parmam habebant ex Bovillo Corio, arte leviter Durata*, but then he adds, *eoque micro nulla materia subiecta*, omitting not only the Ornamental *Studs*, but the *Iron Work*, which *Camillus* first contriv'd as a Defence against the immense Swords of the *Gauls*.

The Roman Way
called High-
street in Lin-
colnshire; by
M. de la Pyrie
n. 203. p. 561.

XXV. The *Roman Way* in *Lincolnshire*, which is call'd all along by the Country People the *High-street*, runs (if I mistake not) almost directly in a straight Line from *Lincoln* to *Humber-side*. It is but Slightly mention'd by Mr. *Camden* as running (says he) from *Lincoln* Northwards into the little Village call'd *Spittle in the Street*, and somewhat further: I shall therefore continue its Course unto *Humber*. This *Street* is cast up on both sides with incredible Labour to a great Height, and discontinu'd in many places, and then

then Begun again. I observ'd where it runs over nothing but bare Mould and Plain *Heath*, that there it consists of nothing but *Earth* cast up, but where it comes to run through *Woods*, there it is not only raised with *Earth*, but also *Paved* with great *Stone*, set Edge-way, very close to one another, that the Roots of the Trees that had been Cut down to make way for the same, might not Spring up again and blind the Road. Which *Pav'd Causway*, is yet very strong, firm, and visible in many places of this *Street*, where *Woods* are yet standing on both sides, as undoubtedly there were in the *Roman* Times, else it had not been *Paved*, and in other places it is *Paved* where nothing of any *Wood* is Now to be seen, though undoubtedly there was when it was Made. In one place I measured the Breadth of the said *Paved Street*, and found it just 7 *Tards* broad, *English Measure*.

This *Street* in its Course full North, as afore said, runs by the Fields of *Hibberstow*, [which perhaps signifies the Place where the *Danish* General *Habbn* was bury'd] in which Fields, not far off this *Street*, is the Foundation of many *Roman Buildings* to be seen; as is manifest, from their *Tile* there Found: and Tradition says, That there hath been a City and Castle there, and there are two Springs, the one call'd *Julian's Stony Well*, and the other *Castleton Well*; and there are several *Old Roman Coins* now and then found there. This might perhaps be some little *Old Roman Town* by their *High-way* side, and was perhaps in after times, before that it was Ruin'd, call'd *Castletown*, or *Casterton*, from its being built upon, or by some of their *Camps* that might then be in those Fields. About a *Mile* further to the Northward on the West side of the said *Street*, upon a great Plain or Sheep Walk, there is very Visible the *Foundations* of another *Old Town*, though now there is neither House, Stone, Rubbish, Tree, Hedge, Fence or Close to be seen belonging thereto. I have counted the *Vestigia* of the Buildings, and found them to Amount to about one Hundred that are yet Visible, and the Number of the *Streets* or *Lanes* are 4 or 5, and not far from it Northward is a place call'd the *Kirk-garth*, where the Church is suppos'd to have stood that belong'd to this Town. Tradition calls this Place *Gainstrop*, and I have read in the *Monast. Angl.* of Lands and Tenements herein given unto *Newsted Priory*, not far off this place, in an Island in the River *Ank*, falsely call'd *Ankham*.

About a *Mile* or two hence, the *Street* runs thro' *Scawby Wood*, where it is all *Paved*, and from thence close by *Broughton Town End*, by a Hill which I should take to be a *Barrow*, and that the Town had its Name from it quasi *Barrow Town*, but that it seems to be too Excessively Great for one: However, I have found Fragments of *Roman Tiles* and *Bricks* there: which, with its Situation so near this *Causway*, make it seem to be of *Roman Origin*. The *Retfords* were Lords of it several Ages until that Sir *Henry Retford* or *Radford* Knight, (with the *Earl of Rutland*, the *Lord Clifford*, the *Lord Clinton*, and others) about the Year 1455, lost it by *Attainder* of *Hgh-Treason*. One of which *Retfords*, call'd *Sir Henry*, but whether the foregoing or no, I cannot yet well tell, laid formerly in *Effigy* of White Marble all in Armour, with his Lady by him, in a Small Quire in the

Vol. 2.

Iron, Lion.

n. 266. p. 677.

North

North side of the Chancel of the Church of the said Town; but was Remov'd in the Memory of Man out of the same, and laid in an Arch within the Communion Rails, and their Room and Place taken up to be the Burying-Place of the Worthy Family of the *Andersons*, now Lords of the Mannor (who are descended from Sir *Edm. Anderson* Knight, Lord Chief Justice of the *Common-Pleas*, in Queen *Elizabeth's* Days, Famous for his Uprightness and Love to the Church; whose Ancestors lived at *Flixburrow* in this County) in which is the Effigies to the Life of Sir *Edmund Anderson* Baronet, most curiously cut in White Marble, lying upon a great *Altar-Tomb*, adorn'd with many *Arms* and *Inscriptions*.

n. 263. p. 563.

vid *Vol. I* Cap.
III. Sect. IX. vid
Sup. Sect. IX.

From thence the *Causway* all along *Paved* is Continu'd about a *Mile* further to the Entrance upon *Thornholm-More*, where there is a place by the *Street* call'd *Bratton Graves*, and a little East, by *Broughton Woodside*, is a *Spring* that I discover'd some Years ago that turns *Moss* into *Stone*; and not far further stands the *Ruins* of the Stately *Priory* of *Thornholm*, Built by King *Stephen*. Opposite to this *Priory*, about a quarter of a *Mile* on the West side of the *Street*, is a place call'd *Santon*, from the *Flying Sands* there which have Over-run and Ruin'd above 100 *Acres* of Land. Amongst these Sands was that great *Roman Pottery* mention'd by Dr. *Lister*. I found there several *Roman Coins*, and Mr. B. of *A.* found a great piece of *Brass* in the bottom of one of the *Furnaces* like a *Cross*, which perhaps was part of a *Grate* to set some *Pots* on while they were *Baking* or *Drying*. Returning back to the *Street*, there are several *Sand Hills*, somewhat like *Barrows* thereby, on the Top of one of which was Erected a great *Flat Stone*, now so far sunk in the *Earth*, that there is not above a *Foot* of it to be seen. Entering then into *Appleby-Lane*, the *Street* leads thro' the West End of the Town, at which Town is two old *Roman Games* yet practised, (tho' very imperfectly) the one call'd *Julian's Bower*, and the other *Troy's Walls*. From hence it runs straight on, leaving *Roxby*, a little Town half a *Mile* on the West, and *Winterton*, a pretty neat Town, (where the Worthy Families of the *Places* and *Neuils* Inhabit,) and then about 3 or 4 *Miles* further, leaving *Wintringham* about half a *Mile* to the West, the said *Street* falls into *Humber*, and there ends; at which End has been a Town call'd *Old Wintringham*, and a sort of a *Beach* for *Ships*. All this End of the Country, on the West side of this *Street*, hath been full of *Romans* in Old time, as may be gathered from their *Moneys*, *Coins*, and the many *Tiles* and *Bricks* that are commonly here found, especially at a *Cliff* call'd *Winterton Cliff*, where has been some Old *Roman Buildings*; and further about 2 *Miles* more Westward is *Alkburrow*, which seems to have been a *Roman Town*, not only from its Name, but also from a Small *Four-square Camp* or *Entrenchment* there, on the West side of which is a *Barrow*, call'd *Countess's Barrow*, or *Countess's Pit*, to this Day, Sunk Hollow in the Middle.

A Strange Well
and some Arti-
quities found at
Kirkbythore; by
M. Th. Machil.
n. 158. p. 555.

XXVI. A *Strange Well* was lately discover'd by the Foot of an Horse, which stumbled upon it, in the common Road through *Kirkbythore* in *Westmoreland*; 'tis about 10 Yards from the *River Troot-beck*, and as many from the

the great *Roman Causeway*, which leads to *Carlisle*, and goes betwixt it and a place call'd the *Burwens*, being part of the *Ruins of Whelp-Castle* on the East side of it; perhaps the *Castle Walls* have gone betwixt it and the River, and the Way run through it, as at *Maiden-Castle* on the top of *Stanemore*. It hath been covered with a Plank of Wood (I suppose of *Oak*) about 9 *Inches* thick, in the fashion of a Potlid; but Decay'd and Macerated to the Colour and Consistence of a *Peat* or *Turfe*: and above this was Gravel and Pavement about a *Yard* thick. Instead of *Walls*, there were two large *Wooden Vessels*, one upon another, like *Hogsheads*, or *Wine-pipes*, with Bungholes in them, about 3 *Inches* Diameter: and the Plowings for the Heads were fair to be seen. They were made of *Fir* (whencesoever they came) above an *Inch* thick; each of them in Depth, by a Perpendicular, 6 *Foot* at the least, at the Heads in Diameter, 2 *Fr.* 8 *In.* and in the Middle 3 *Fr.* 5 *In.* At the Bottom, about 5 *Yards* Deep, were 4 Planks of Wood, laid Quadrangular wise, supported with a Stone at every Corner, to bear up the Fabrick, and let in Water through the Gravel and Sand, which lay loose in the bottom about a *Yard* Deeper. The Wood of the Vessels and the Planks were *Sound* (though the Cover was *Rotten*) because not so much Exposed to the Air.

The Workmen flattered themselves with the Hopes of some *Treasure*, but they only found some *Old Earthen Vessels* with pieces of *Urns*, one piece of a *Drinking Glass*, and several *Sandals*. The *Earthen Vessels* were of very *Fine Metal* (if I may so call it) of a Brick like Colour, and in several Forms; but the most (and most Remarkable) were like a *Bason*, or *Possiet-Cup*; the Bowl, Semiglobular; the Foot, a Ring: Some were in Diameter about 8 *Inches*, and in Depth on the inside, more than 3 *In.*; some more, some less, as appeared by the *Fragments* which came unto my Hand. They were (for the most part) very *Finely Imbossed*; but 3 more especially, viz. One with a *Vine-branch*, having a Figure in every Turning, and in the first place a *Naked Man* standing alone upon the Left Foot, the other Leg Cross, and holding his Left Hand down towards his Back, his Right towards his Belly, with a Branch of *Lawrel* of 3 Sprigs in it, one of which turns up to his Face-wards over the Crook or Bending of his Arm; and at his Feet is a Branch of *Lawrel* and a Blossom or Flower: In the next is a *Vine Leaf*, 2 Blossoms at the bottom; and at the top 2 *Peacocks* Regardant. In the next is a *Victory*, (as I take it) viz. an *Angel* or *Genius* holding in its Right Hand (the Arm stretched out, and the Face looking towards the *Man*) a Garland of *Lawrel*; in the Left a Sprig of the same; and two Sprigs likewise are at the Foot with Flowers or Blossoms, and one Flower in the Middle betwixt the Garland and one of those Sprigs: In the Next is a *Vine Leaf* the same as before, in the next is *Victory*, and so by turns, till it ends with a *Vine Leaf* next the *Man*. And upon it are also some *Goth-like* Characters of the *Lesser* sort, but dim and obscure. Another of these *Pots* is adorn'd with Circles and Semicircles, in one of these Circles is the Figure of a *Man*, sitting on a *Plinth* or Square Stone; in all the rest are fluttering *Genii*. In some of the Semicircles are *Lions* and *Goats* (or some such like Creature)

Fig. 25.

Creatures) here one, and there another; all single and current: and near the bottom are *Stags* in Courie, and *Gray Hounds* pursuing, with an Inscription (in a *Goth-like* Character of the *Greater* sort) which see Fig. 25. This may be *Paulini*. An Inscription with the like Characters, is to be seen at *Burrow Brigg*, and publish'd by Dr. *Lister*. And they have been Careful in Preserving These; for This and some other, having been broke, are Cramm'd (or rather Soldered) with Lead. The 3d Sort is yet far more beautiful than any of the rest, being adorn'd with *Gray-Hounds* very well moulded, and in full Pursuit of *Stags* and *Hinds*, and the *Wild-boar*; upon which I discover'd the same Inscription, as in the other. And tho' I am not so vain, as to say this relates to *Our Coats of Arms*, yet having so near an Affinity with it both in *Crest* and *Charge*; (*a.* the *Stag's Head*; *b.* 3 *Gray-Hounds* Current; *c.* *Whelp Castle*;) and being found at the place which we came from (as is said and believ'd) I cannot but take some Notice of it. There were several other Broken Inscriptions, and one above the rest upon the bottom of a Plain Dish or Platter (on the inside of it) writ as in Fig. 26, but whether it stands for *Vespasian Emperor*, or *Domitianus*, or neither of them, I cannot tell.

Fig. 26.

As to the *Glass*, there was but a very small Fragment of it, I can scarce guess the Figure, but I think it a *Flute-Glass* made like a Tunnel or Spire inversed. It hath been as Thick as a Barly Corn.

The *Urns* were of a *Leaden Colour* inclining to black; one had been Large, 2 Inches thick in the side of the Pot, but how big I know not, for there was a Sherd only brought to me. The Top was in Diameter from out-side to out-side 7 Inches, of which the *Roll* is 2 Inches, and the *Mouth* 3 Inches; The *Neck* yet Straighter, and only $\frac{1}{2}$ of an Inch thick. And many such are found at this Town, some of which have *Ears* and *Handles* as thick as my Arm-wrist, and their *Heads* and *Mouths* much of this bigness, but thicker and stronger. But the other was almost entire and whole, tho' a very small one; in Height $8\frac{1}{2}$ Inches, in Diameter $6\frac{1}{2}$, at the Mouth almost $3\frac{1}{2}$, and in the Neck more than $2\frac{1}{2}$. The Bottom well nigh as Big as the Top excepting the Ring, and the Body in Thickness the 5th part of an Inch: but Thicker somewhat at the Top and the Bottom.

Fig. 27.

The *Sandals* were some for *Men*, some for *Women*, and some for *Children*; all Shaped by their Feet, spreading more to the outside than to the inside: and some were very large, and some crooked as *g*. The Leather was fresh of which they were made, but very tender when it came to be spread upon a Last. Each consisted of 3 principal parts; an *Upper-Leather* (or, rather *Heel-piece* with two *Tab*s on each side) an *Inner Soal*, *a.* Long $11\frac{1}{2}$ Inches, Broad $3\frac{3}{4}$; of 3 or 4 *Soals* stitched together with *Leathern Thongs*; and an *Outer Soal* *b.* of 2, stuck full of *Nails* with little round Heads (so Decay'd and Rotten, that I could scarce discern them to be Iron) Plated on the Inside: and to the *Upper Leather* (3 Fold in the *Heel-piece*, *c.*) is fix'd betwixt them and sowed with Leather, or rather tacked, which the *Iron Nails* do help to Defend. Yet I think some *Womens* (of the better sort) had no *Nails* at all, *d.* And of these there is one well worth the Observation,

in, of *Spanish like Leather*, and curious *Workmanship*, *f.* being exactly Ritch'd down round about the *Fore piece* long 2½ *Inches* with a pretty *Label*, *e.* of the same piece Hanging from it, for *Fashion-sake* surely; since 'tis too slender to be of any *Use*. As small in the *String* as the 15th part of an *Inch*. The *Tongue* at the *End*, Broad half an *Inch*, Long one *Inch*, betwixt the two *Flourishes*, which is the *Length* of the small *String*, 8 parts in 10 of an *Inch*, the two *Flourishes* take up the rest. It is a long time since any *Sandals* were worn in this *Country*; and I am well inform'd that these are very different from the *Broagues* of *Ireland* and the *Highlands* in *Scotland*; For Those have but *One Single Soal*, and These have *Six*.

XXVII. The *Runic Inscription* at *Beaucaſtle* in *Cumberland*, (communicated by the Lord *Will. Howard* to Sir *H. Spelman*) appears to have been formerly much Larger than * *Wormius* has given it: But it is now so miserably Defaced, that in 6 or 7 *Lines*, none of the *Characters* are fairly discernible, save only; *ᚱ ᚷ ᚹ ᚻ*; and these too are Incoherent, and at great Distance from each other. However, this *Epistylum Crucis* (as Sir *H. Spelman* has call'd it) is to this Day a Noble *Monument*. 'Tis one entire *Free-Stone* of about 5 *Yards* in *Height*, Washed over (as the *Font* at *Bridekirk*,) with a *White Oily Cement*, to preserve it the better from the *Injuries* of *Time* and *Weather*. The *Figure* of it inclines to a *Square Pyramid*; each side whereof is near 2 *Foot* Broad at the bottom, but upwards more *Tapering*. On the *West* side of the *Stone*, we have 3 fair *Draughts*, which evidently enough Manifest the *Monument* to be *Christian*. The lowest of these represents the *Portraiture* of a *Layman*; with an *Hawk* or *Eagle* perch'd on his *Arm*. Over his *Head* are the fore-mention'd *Ruins* of the Lord *Howard's Inscription*. Next to these, the *Picture* of some *Apostle*, *Saint*, or other *Holy Man*, in a *Sacerdotal Habit*, with a *Glory* round his *Head*. On the *Top* stands the *Effigies* of the *B. V.* with the *Babe* in her *Arms*; and both their *Heads* encircled with *Glories* as before.

On the *North*, we have a great deal of *Chequer-Work*; subscribed with the following *Characters*, fairly Legible.

ᚱ ᚷ ᚹ ᚻ ᚱ ᚷ ᚹ ᚻ

Upon the first Sight of these *Letters*, I greedily ventured to Read them *Rynburu*: and was wonderfully pleased to fancy, that this Word, thus singly Written, must necessarily betoken the *Final Extirpation* and *Burial* of the *Magical Runa* in these *Parts*, reasonably hoped for, upon the *Conversion* of the *Danes* to the *Christian Faith*. For that the *Danes* were anciently gross *Idolaters* and *Sorcerers*, and that they brought their *Paganism* along with them, is beyond *Controversy*. This *Conceit* was the more heighten'd, by reflecting upon the *Natural Superstition* of our *Borderers* at this Day, who are much better acquainted with, and do more firmly believe, their *Old Legendary Stories* of *Fairies* and *Witches*, than the *Articles*

Runic Inscriptions at Beaucaſtle; by Mr. Will. Nicholson, n. 178. p. 1187.

* *Mon. Dan. p. 161.*

cles of their *Creed*. And to convince me yet further that they are not utter Strangers to the *Black-Arts* of their Fore-fathers, I accidentally met with a Gentleman in the Neighbourhood, who shew'd me a Book of *Spells* and *Magical Receipts*, taken (2 or 3 Days before) in the Pocket of one of our *Moss Troopers*: Wherein, among many other *Conjuring Feats*, was Prescrib'd a certain Remedy for an *Ague*, by applying a few barbarous Characters to the Body of the Party Distemper'd. These, methought, were very near a-kin to *Wormius's* R A M R U N E R, which, he says, differ'd wholly in *Figure* and *Shape* from the common *Runa*.

But if this Conjecture be not Allowable, I have another something (it may be) more Plausible. For if, instead of making the 3d and 4th Letters to be two, *K.K.H.H.* we should suppose them to be *†.†.* E. E. the Word will then be *Ryeeburu*; which I take to signify in the old *Danish* Language, *Cæmeterium*, or *Cadaverum Sepulchrum*. For though the True old *Runic* Word for *Cadaver* be usually written **R†† Hrae*; yet the *H* may, without any Violence to the *Orthography* of that Tongue, be Omitted at pleasure; and then the Difference of Spelling the Word, here at *Beaucastle*, and on some of the Ragged *Monuments* in *Denmark*, will not be great. And for the Countenancing of this latter Reading, I think the above-mention'd *Chequer-work* may be very Available; since in that we have a Notable Emblem of the *Tumuli*, or *Burying-Places* of the Ancients. (Not to mention the early Custom of Erecting *Crosses* and *Crucifixes* in *Church-Yards*: Which, perhaps, being well Weighed, might prove another Encouragement to this 2d Reading.) I know the *Chequer* to be the *Arms* of the *Vaux's*, or *de Vallibus*, the Old Proprietors of this Part of the North; but that, I presume, will make nothing for our Turn; because this and the other Carv'd Work on the *Cross*, must of necessity be allowed to bear a more ancient Date, than any of the *Remains* of that Name and Family; which cannot be Run up Higher than the *Conquest*.

On the *East*, we have nothing but a few *Flourishes*, *Draughts* of *Birds*, *Grapes*, and other *Fruits*: All which I take to be no more than the Statuary's Fancy.

On the *South*, *Flourishes* and *Conceits*, as before; and towards the Bottom, the following Decay'd *Inscription*.

[†.†.NB :: †RMT:]

The Defects in this short Piece, are sufficient to Discourage me from attempting to Expound it. But (possibly) it may be Read thus:

Gag Ubbo Erlat, i. e.
Latrones Ubbo Vicit.

I confess this has no Affinity (at least, being thus Interpreted) with the Foregoing *Inscription*: But may well enough Suit with the Manners of

of both Ancient and Modern Inhabitants of this Town and Country.

XXVIII. The Fabrick of the *Font* at *Bride-kirk* in *Cumberland* does, I think, fairly enough evince that it is now us'd to the same purpose for which it was at first design'd. For on the *East* side of this Stone, we have fairly Represented a Person in a long *Sacerdotal* Habit Dipping a Child into the *Water*; and a *Dove* (the Emblem, no doubt, of the *Holy Ghost*,) hovering over the Infant. Now I need not here observe, that the Sacrament of *Baptism* was anciently Administred by *Plunging* into the Water, in the *Western* as well as *Eastern* Parts of the Church, and that the *Gothick* Word **ANILCAN** (*Mark* 1. 8. and *Luke* 3. 7, and 12.) the *German* Word *taufen*, the *Danish* *Døbe*, and the *Belgick* *doopen*, do as clearly make out that Practice, as the *Greek* Word *βαπτίζω*: Nor, that they may all seem to be Deriv'd from [*δύπαι*] another Word of the same Language and Signification; and are evidently a-kin to our *English*, *Dip*, *Deep*, and *Depth*. Indeed our *Saxon* Ancestors expressed the Action of *Baptism* by a Word of a different Import from the rest: For in the fore-mention'd place of *St. Mark's* Gospel, Their Translation has the Text Thus: *lc eoþ pullige on þætepe. he eoþ pullas on halgum gæpe.* 7. 1. *Ego vos Aquis Baptizo; ille Vos Spiritu Sancto Baptizabit.* Where the Word *pullian* or *pullizean* signifies only simply *Lavare*: Whence the *Latin* Word *Fullo*, and our *Fuller*, have their Original. But from hence to Conclude that the *Saxons* did not use *Dipping* in the Sacrament of *Baptism*, is somewhat too harsh an Argument.

On the *South* side of the Stone, we have this *Inscription*:

† R. I W A R E : * † : † : I P R A Y † : † : † :
† : † : † : R D : † R : † : B R I Y † :

Now this Kind of Characters are well enough known, (since *Ol. Wormius's* great Industry in making us acquainted with the *Literatura Runica*) to have been chiefly us'd by the *Pagan* Inhabitants of *Denmark*, *Sweden*, and the other *Northern Kingdoms*; and the *Danes* are said to have swarm'd mostly in these Parts of our Island. Which two Considerations seem weighty enough to persuade any Man, at first Sight, to Conclude that the *Font* is a *Danish Monument*. But then on the other hand, we are sufficiently Assured, that the *Heathen Saxons* did also make Use of these *Rune*; as is plainly evident from the frequent mention of *Runcpæptigen* and *Runcpæp* in many of the *Monuments* of that Nation, both in Print and Manuscript, still to be met with. Besides, we must not forget that both *Danes* and *Saxons* are Indebted to this Kingdom for their *Christianity*: And therefore thus far their Pretensions to a *Runic* (*Christian*) *Monument* may be thought Equal. Indeed some of the Letters (as *Ð*, *Ʒ* and *ȝ*,) seem purely *Saxon*, being not to be met with among *Wormius's* many *Alphabets*:

K k k 2

A Runic In-
scription on the
Font at Bride-
kirk: by Mr.
Will. Nicolson.
p. 178. p. 1291.

and

and the Words themselves, (if I mistake them not,) come nearer to the Ancient Saxon Dialect, than the Danish. However, let the Inscription speak for itself.

Er Ekard han men egroeten, and to dis men red wer Taner men brogten, i. e.

Here Ekard was Converted; and to this Man's Example were the Danes brought.

Who this *Ekard* was, is a Question hard to be answer'd. The proper Name itself is ordinary enough in the *Northern Histories*; though variously written: And 'tis certainly a Name of Valour, as all others of the like Termination; such as *Bernhard, Everhard, Gothard, Reinhard, &c.* So that it may well become a *General*, or other great Officer in the *Danish Army*: And Such we have just Reason to believe Him to have been, who is here Drawn into an Example for the rest of his Countrymen.

Han men egroeten; which render'd *Verbatim*, is, *have Men Turn'd*, i. e. *was Turned*, is a Phrase to this Day very familiar in most *Dialects* of the ancient *Celtick Tongue*, though lost in our *English*. In the *High-Dutch* it is especially obvious; as *Man Saget, Man hat gelaght, Man Lobet, &c.* And the *French Impersonals*, (*On dit, on fait, &c.*) are of the same Strain; and evident Arguments, that the *Teutonick* and *Gaulish Tongues* were near A-kin.

The Characters ‡ † and ✕ are manifest Abbreviations of several Letters into one: Of which sort we have great Variety of Examples in several of *Wormius's Books*: And such I take the Letter Ð to be instead of ‡ and †; and not the *Saxon Ð*. I must believe 7 to be borrowed from the *Saxons*; and 3 I take to be a Corruption of their † or W. The Rest has little of Difficulty in it. Only the *Language* of the whole, seems a mixture of the *Danish* and *Saxon Tongues*: but that can be no other than the natural Effect of the two Nations being Jumbled together in this Part of the World. Our *Borderers*, to this Day, speak a *Leash* of *Languages* (*British, Saxon, and Danish*) in One; and 'tis hard to determine which of those 3 Nations has the greatest Share in the *Motley Breed*.

An ancient Monument at Foulsham in Norfolk; by Sir P. S. N. 189. p. 361. XXIX. In the Church-Yard at *Foulsham* in *Norfolk*, there is a *Tomb-stone* with this *Inscription*, which some of the Learned in these *Curiosities* may perhaps Explain.

On One Side

AK COG GGG

At One End

OOO

On the Other Side

EDT DESWEA

On the Other End

BOG

Some Saxon Coins found in Suffolk; by Sir P. S. N. 189. p. 361. XXX. 1. In May 1687, at *Honedon nigh Clare* in *Suffolk*, the *Sexton*, as he was Digging a Grave in the Church-yard Deeper than ordinary, met with a *Skull*, and near it many Pieces of *Saxon Money*, which are generally of the same Bigness, viz. of a *Groat*, and about the same Weight: But the

the *Inscriptions* are so *Variouſ*, that there are ſcarce Two of them alike. I gueſs this *Variety* of *Inſcriptions* ariſeth from the many *Maſters of the Mint*, who were appointed to *Coin Money* in ſeveral Places, and who might each of them have a different *Stamp*. For I have obſerv'd great *Variety* in *H. 3. Coin*, viz.

NICOLE ∞ LVND.
WILLELM ∞ LVND.
WILLELM ∞ CINT. *Canterbury. quær.*
RICHARD ∞ GLOV.

Theſe Names being probably the *Maſters of the Mints*, the *Laws* as to the *Mints* being not Alter'd. 1 *Hen. VI. Chap. I.* The *King's Council* might Aſſign *Money* to be *Coin'd* in as many Places as they will. (a.)

Theſe *Saxon Monies* were *Denarii*, or *Pennies*, which in *Ethelred's* time was the 20th part of the *Silver Ounce Troy*. Five of thoſe *Pennies* made a *Shilling*, and 240 of them made a *Pound*: which is the preſent Proportion of our *Penny* and *Pound*, tho' the *Intrinfick Value* be about Three to One Different. There were (they ſay) between 200 and 300 Pieces; If 240. i. e. 1 *l.* then it would ſeem probable that the Deceas'd might have order'd ſo many to be Bury'd with him, as a kind of *Expiation* for having Privately Kill'd a *Dane* of *Servile Condition*; for in *Ethelred's Law* there is this Penalty, *Servilis Conditionis Dacum ſi Anglus morte effecerit, integram ſolvito Libram*; If more, or leſs, was found, it might answer another *Mulct* enjoin'd by the *Saxon Laws* for Killing or Maiming ſome Perſon of another Quality; or the *Æſtimatio Capitis* might be laid in the Grave with the Perſon that was Kill'd. However, it is very Probable, that the *Money* was Bury'd upon ſome ſuperſtitious Account. *Vid. Fig. 28.*

Greaves of the
Denar. p. 117.

On ſome of theſe *Monies*, there are very odd *Saxon Characters*. Some are Diminiſh'd in their Weight, by lying long under-ground, and ſeveral of them Colour'd *Green* (c.) The *Reverse* of the 13th is the ſame with the 12th. That of the 14th is written round the *Croſs*, ſo are thoſe of the 18, 19, 20, 21; whereas moſt of them are not ſo; but there are Two Lines of Letters with Three *Croſſes* between them. The little o. in ſome of them is Periodical. The $\vdash$ in the 19th is a very clear Character, and ſtands for a Letter that is not defac'd.

In the 20th *Reverse*, [*Sterling, &c.*] P & T. paſſim confundi Docti obſervant πέντε pro πέντε, πολλὰ pro πολλὰ, &c. *Ruspina pro Roſtina, &c.* *Bochart. Geogr. p. 450, 706.* Denarium & Sterlingum eundem eſſe Nummum, (*Matth. Pariſ. in Hen. III. 13. Solidis & 4. Sterlingis pro Marca qualibet computatis.*) Vox ipſa *Sterling*, utrum formatur a Signo quod imprimebatur iſti Nummo, & *Sterlingus* ſit quaſi *Stellatus*; an potius *Eaſterlingus* denominatus a *Populis*, qui *Eaſterlings* dicuntur, ambiguum faciunt *Scriptores*. *Gronovius de Seſtertiis, p. 346.* (1.) But I find *Gronovius* may be corrected in what he Writes in the *Addenda* to the ſame *Treatiſe*, by this *Reverse*, *Dubium non eſt* (ſays he) ſi *Saxonibus Angliſ* deberetur ea *Vox*, *Sterling* in Monumentis

numentis illorum repertam iri. — Constat inter omnes, ante Normannorum Ingressum in Angliam, non reperiri mentionem hujus Vocabuli; cum ipso Gulielmo primum Legi, Sterlingos, &c. appellatos, ergo his debetur ea Vox in Anglia. Yet I believe what he Writes just before, Denariis autem nomen etiam Sterlinges fuisse, in Continente qua Normanni imperabant, ostendunt duo Rescripta Pontificum Romanorum in Decreto Gregorii; and he might well have Added, That the Normans borrowed of the Franks that Word Sterling, as well as Descriptionem Libræ per Solidos Denariosque. But it may be, when Gronovius writ, no Coin nor Monument of Antiquity was then discover'd in England that mention'd Sterling before William I, whose Name brings to my Mind, that on his Coin (n.) P, is put for W.

Gloss.

Sir H. Spelman takes Sterling and Denarius to be the same; and he directs to the Statute made An. 1302. 31 Edw. I. wherein the Penny is called Sterling, and the Weight of the Sterling is 32 Gr. of Dried Wheat; (and I have weighed 32 Gr. of Wheat, and they are equal to 24 Grains Troy Weight, which is our Saxon Penny.) And An. 1496. 12 Hen. VII. Cap. 5. there is another Statute wherein the Sterling is of the same Weight.

I am credibly Inform'd, some of the Egbert's and Ethelbert's Coin were found amongst them: Those I saw were Ethelstan's, who began his Reign about the Year 925. Edmund Etheling, his Brother, (for I take the Edmunds to be his) who began his Reign 940; Edred, another Brother, who began his Reign 946.

Remarks; by
W.W. 1b. p. 361.

2. (a) This Law was in force till Henry VII, who first, that I can find, Quartered the Arms of England with France in his Common Silver Coins, on their Reverses: This, his Successors have since follow'd; before, they writ Civit. London; Civitas Cantuaria; Villa Calestia; the want of knowing this Custom, has caused some Learned Men to mistake some Coins of Edw. IV. with Civitas Norwic. on the Reverse, for Medals Stamp'd in Memory of Ket's Insurrection, by Edw. VI. Golden Medals in Memory of great Actions, are of Ancient Use amongst us; witness that Golden Coin of Edw. III. where a Shield with the Arms of England and France over a Ship, is Stamp'd, to shew his Title to the Kingdom of France, which he then Claim'd; yet this can hardly be shew'd in Silver Coins, which then passed for Current Money; that seems to have been Peculiar to the Greeks and Romans, except some Instances of these Two last Ages. The single Exception of Edw. III. who Quartered England and France in his Money, doth not weaken my Assertion: since it was Extraordinary, as a more Publick Proclamation of the Justice of that Title which he set on Foot against Philip de Valois.

(b) This Reverse [n. 1.] is to be Read PENE PHEO; i. e. Penny-Money, a Duplication usual amongst the Saxons; so afterwards Sterling Money. Feoh, or Feoh, is a common Word for Money, St. Mark xii. 41. þa sæt he ðælen on gen þæne tolyceamol, geseah hu þæt polc-hypa feoh; Then sat Jesus over against the Treasury, and saw the People put in Money.

(c) LAND

(c) LAND WEHO [n. 2.] This was Coined in Memory of a Land-Tax, Raised by Ethelstan to support his Wars against the Danes and Scots; against whom, especially the Scots, he was always Victorious. This is the only Ethelstan, who was ever King of England: But there was another Ethelstan, King of Kent only, Son to Egbert, who beat the Danes at Sandwich, in An. 852.

The Variety of Letters in these Reverses is Remarkable: The last Word in these two Reverses is manifestly to be Read alike, yet the Form of the Letter is vastly different. This Variety arose from the Multitude of Mints, which did not all tie themselves up to one Stamp, nor to the Same Letters.

AREM (d) This I should Read [n. 4.] REGIA MONETA, to Distinguish it from the Bishop's or Abbot's, for it was Coin'd at Canonbury; A, I take to be a Mint-Master's Mark.

(e) Tho' these Coins, as far as I can Judge, are as good Silver as any Current with us, if not better; yet since what Alloy is in them is of Brass, I am apt to think, that the Acid Steams in a long Series of Ages arising from the Human Bodies, might Corrode so far into the Metal as to raise some little Verdigrise upon the Surface of the Coins; to which that Greenness is to be imputed.

(f) Probably this Albericus [n. 7.] was a Noble-man, and they might have had the Jus Moneta, as well as Bishops and Abbots; but I must confess I cannot make that out clearly. H. before G. is an usual Transposition; so H Clotharius, H Ludowicus.

(g) This I Read, IVE MONETA, [n. 8.] or I've Money, that is, Money Coin'd at St. Ives in Huntingdonshire. The H. as also I, both used for M, are Remarkable. Bouteroue, in his Disquisitions on the Old French Monies, gives us some Gallick Epitaphs from which he draws an Alphabet of the Old Gauls: In that H, M, are used for M; so that possibly the Britains might likewise use them. It is manifest they are not Saxon Letters; and I see no Absurdity to allow the Saxons to have borrow'd them from the Britains, and to have used them amongst their own Capitals. There is a Coin in Tab. 3. Coin 14. of the Collection Prefix'd before Elfred's Life, which has two other of those Gallick Letters of which Bouteroue has given us an Alphabet. The Coin is,

R M I L B E R I L E
 A L F R E D + + +
 F I R D A A L E D M

The S and E are S and F in his Alphabet; and I am apt to think, that that Inversion of Letters in these Saxon Monies, as M for M, L for

for **M**, **E** for **F**, took its Rise from them ; for in this *Alphabet* we have **W** and for **V** **D** ; **S** **Z** and **Z** for **S** : However, this will evince, in some measure, the Practice of such *Inversions*, which made some Learned Men take them for *Runic*, *Gothic*, or indeed for any *Characters* with which they were little acquainted.

(b) [*n.* 9.] This and the *Reverse* of 11, are to be Read alike ; tho' they were Coin'd at different Places, as appears from the *Variety* of the *Letters*.

(i) **F** which is used here [*n.* 16.] for **M**, is frequently used in that *Collection* of *Saxon Coins* prefix'd to *Alfred's Life*.

(k) This *Gota Mone*, or God's Money, [*n.* 17.] was the *Peter Pence* which was Collected Yearly, and sent to *Rome*. *Ina*, one of the Kings of the *Mercians*, first gave it ; thence it was constantly paid afterwards, tho' now and then Intermitted in the Heat of the *Danish Wars*. I suppose this *Coin* came out of an *Ecclesiastical Mint*.

(l) The true Original of *Sterling* is *Starry*. The common People observing the *Crosses* upon the *Coins*, which looked like so many *Stars*, call'd them *Sterlings*, *Starry Pieces*. *Ling* is an *Adjective* Termination in the *Saxon Language* ; so in time the Word became *Substantive*, and was used promiscuously for *Penny*.

(m) The 19 and 21 *Reverses* are to be Read alike, tho' possibly they might be made from Different *Stamps*. The *Letters* in both (for neither are very Clear) will mutually explain each other. I read it **MA** **HECH' HONE**, or *Malmsbury Money* : The **h**, which is an entire Letter, seems to have been taken from the Square **B**, or **B**.

(n.) This **P** was the old *Saxon p*, or *W* ; so it was *Willem*, not *Pillem*. The *Saxon Character*, which was Full and Plain, gave Rise to that small Beautiful Character, which we usually call the *Roman Letter*. The ancient *Romans*, for ought that yet appears to the contrary, wrote all with One Uniform Character, sometimes Greater and sometimes Less, of the same Figure with the *Great Letters* in our *Alphabet*. This they took from the *Greeks* ; and it is usual in all the *Alphabets* of the *Oriental Nations*. The 3 *Inscriptions* in *Gruter*, (*pag.* 185. 3. *p.* 652. 2. *p.* 182. 7.) only prove that they had our Small *t*, *p*, *b*, *h* ; for we have no Hints in our *MSS.* of any others. After them succeed the *Francick* or *Merovingian Character*, entirely left off in Transcribing Books after *Charlemagne*. The *Notaries* kept it Longer ; only by making it Longer, they brought it to something like the *Italica*, to which it possibly gave Rise. The Specimen in *Mabillon's Fourth Book*, *De Re Diplomatica*, will put this past Doubt. All this while the *Saxon Character* was used in *England*, whose *Alphabet* is Evidently the same with the Small *Roman*, except some *Letters* which expressed Sounds proper to Their Language, as **þ**, **ð**, **ſ** : Wherefore when *Alcumus* (Scholar to *Egbert*, Archbishop of *York*) went over into *France* to *Charles the Great*, and afterwards sent for Books out of *Egbert's Library*, as may be gathered from *William of Malmsbury*, he introduced that Fine Way of Writing, which immediately took place with all but the *Publick Notaries*. *Mabillon* owns the Thing in Effect, tho' he dissembles the Original : *Primæ Stirpe extinctâ, Carolus M.*

Literas

Literas expolire cepit, aut certe jam tantisper exspolitum Scripturæ Genus à Merovingico in Elegantiores Formam commutavit, quæ in eandem Formam evasit, quæ hætenus Minuti Romani Characteris Nomen retinet, (Lib. I. Cap. II. Num. 10.) And if this Change was not wrought in a Moment, because the Transcribers used to the old *Merovingian Hand* conform'd it to the New, as much as they could, yet that wore off by Degrees; so *Mabillon*, quæ [*Carolina Scriptura*] *principio nonnihil Merovingici Characteris habebat intermixtum; at subinde Politiore effecta, in eandem formam, &c.* *Mabillon* acknowledges, that *Alcuin* introduced the Modern Punctuation into the French MSS in Records, which he Learn'd from the Saxons, particularly [...] for a full Period, as is manifest to all that shall look into the Saxon MSS, or Printed Books in Imitation of them.

Besides, all our Latin MSS in England, till some time after the Conquest, were writ in the Saxon Character. So Archbishop Parker Publish'd *Asserius Menevensis*: and there are several Latin MSS in the University Library of Cambridge, written in the Saxon Character. And it is no Wonder that those Letters which expressed Sounds not used in the Roman Tongue, should be left out by the French Transcribers, who at the same time might use Saxon Copies: So that it is not strange *Vossius* should be Mistaken, when he thought Ω and $\mathfrak{D}$ were from the Greek, and Θ , who did not consider them to be both Runick Letters, which were introduc'd upon a particular Occasion, by *Chilperic*, who took them from the *Visigoths* in Spain, as *Wormius (de Literatura Runica)* has probably Proved from *Gregorius Turo-nensis*, and a Constitution of the same *Chilperic* Printed in *Goldastus*: yet I will not Deny, but *Theodore*, or some other of those Greeks, who in that Age had so great Intercourse with England, might introduce some Greek Letters to express those Sounds which they had not in their Own Language; from hence they were carry'd into France, with the rest of the Saxon Alphabet, and so into Italy; which *Mabillon* also in Effect acknowledges, when he says, *Hanc tamen Scripturæ Formam non Franci à Romanis, qui Longobardicis passim Elementis tunc utebantur, sed à Francis Romani accepisse videntur.*

3. Amongst the few Coins which I purchased of the Sexton of *Honedon*: I find these 3 not mention'd by Sir P. S. Vid. Fig. 29.

An Addition by
Mr. Sam Dale.
n. 203. p. 874.
Fig. 29.

XXXI. 1. There was a curious Piece of Antiquity lately found at *Ashel-ney* in *Somersetshire*; the place where King *Alfred* built, as *Milton* affirms, a Fortrefs; but according to *William of Malmsbury*, a Monastery, in Memory (as some have thought) of his Deliverance, obscure Retreat to that place, and Concealment in it, from the Danes. The Work is so very Fine, that some have question'd its true Age: But in all Probability, it did belong to that great King. The Edge is thin, as far as the Letters. The Letters are on a plain Rising obliquely. All within the inner Pyramidal Line is on a Plane equidistant from the Reverse. The Representation (in that upper Plane) seems to be of some Person in a Chair. It is in Enamel, covered over with a Chrystal; which is secur'd in its place by the little Leaves com-
Vol. III.

A Piece of Sax-
on Antiquity
found in Somers-
etshire; by Dr.
Will. Mulgrave,
n. 207. p. 441.
Fig. 30.

ing over its Edges. In the *Reverse* are Flowers engraved. The whole Piece may be of the Weight of 3 *Guineas*. The *Crystal* and the *Enamel* excepted, it is all of pure *Gold*. This perhaps was an *Amulet* of King *Alfred's*.

By Dr. Geor.
Picks n. 260.
p. 464.

Will of Malm-
bury.

2. This curious Piece of *Saxon Antiquity* is in the Possession of *Nathaniel Palmer Esq;* of *Fairfield* in *Somersetshire*. The Air, the Shape of the Face, and the two United Scepters in each Hand of it, made me at first think, that probably it might be that of our *blessed Lord*; but having since seen a Picture of *St. Luke* in a most Ancient *Latin MS.* of the *Gospels*, all written in *Capitals*, with such-like Scepters in each Hand, I am inclined to think, that this was the common Way, in those Times, of Drawing or Representing *Saints* among the *Saxons*, and that the Picture in *K. Alfred's Antiquity* (for so I now call it) might be the Picture of his Patron *St. Cuthbert*, whom He, and his Mother, both in one Night Dream'd they Saw, and Heard speak the same Words, in which he told him, He should Conquer the *Danes*, and be a great King, and bid him be of good Courage. This Vision of *St. Cuthbert* happen'd to him after he was Beaten by the *Danes*, and had Retired in great Distress into *Athelney*, where this *Antiquity* was found; and He was so affected with it, that he afterwards used to tell it all his Life long, and ascribe his Success over the *Danes* to the Merits of *St. Cuthbert*. And as the King used to commemorate the Vision He and his Mother had of Him, so it is very likely he order'd this Picture to be made of Him, to hang down by a String upon his Breast, for a constant Memorial of the *Saint*, who appear'd to him, to bid him give the *Danes* Battel in a time of great Despair, when he looked on himself as Conquer'd, and thought his Kingdom almost Lost. That he caused the Picture to be made, is plain from the *Saxon Inscription*.

AELFRED ME[HETI GEWYR[AN.

Aelfredus me jussit Fabricari.

And that it was made to hang down upon his Breast, is plain from the *Con* or *Apex* of the *Figure*. And that the *Original* is a True and *Genuine* Piece of *Antiquity* is also Clear beyond all reasonable Doubt, not only from the Place where it was found, the Place of King *Alfred's* Retreat from the *Danes*, which he *Fortified* in time of War, and where he Built a *Monastery* in time of Peace; but also from the *Inscription*, which is all, except two, in *Roman* or *Gallo-Italick Letters*, which the King, who was Bred at the *English School* in *Rome*, prefer'd before those of the *Saxon* *Dust*; and who he came to be King, as *Ingulph* testifies, he brought them into Use. Some I hear have suspected this *Antiquity*, because of its extraordinary Artifice which they think too fine for that Age. But it is not to be Doubted, but that King *Alfred*, who was so great a Prince, could easily procure the best Artificers of that Age from all Parts of the *Christian World*, by the Correspondence and Interest which he had at *Rome*.

The

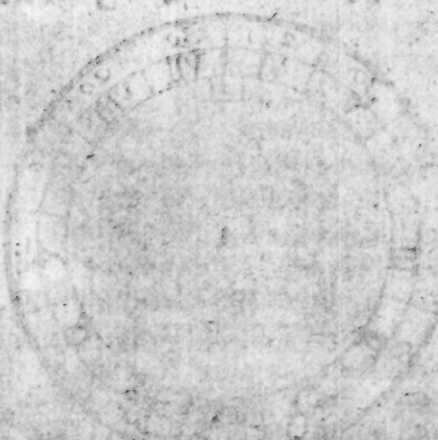
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S. p. 221.

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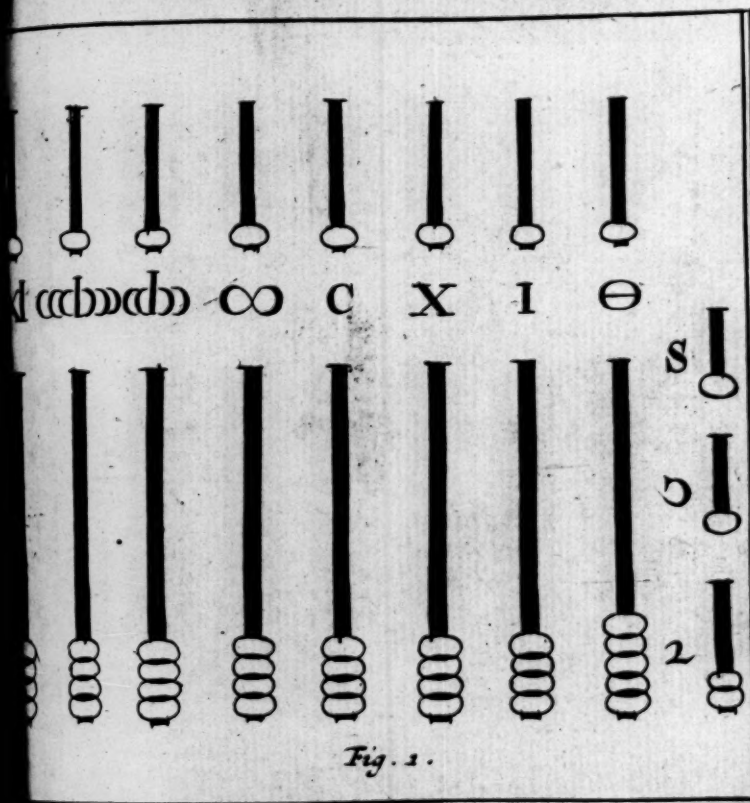
p. 31.

The
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M. D. I.
DISTRICT OF COLUMBIA
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RECEIVED
U. S. DEPT. OF THE INTERIOR
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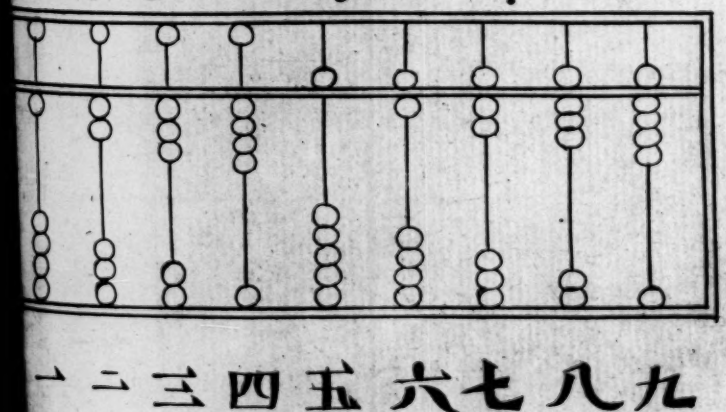
The Roman Abacus out of Marcus Velserus



ye lh' san su v lö xiē pā
 1 11 111 1111 11111 111111 1111111
 I II III IV V VI VII VIII
 lh' xē lh' xē san xē san xē su xē
 11 11 11 11 11 11 11 11
 XX XX XXX XXX XXXX XXXX
 pe' pe' lh' pe' san pe' su pe'
 111 111 111 111 111 111 111 111
 100 100 200 300 400
 xiēn lö' pe' pā xē lö nu
 111 111 111 111 111 111 111 111
 C D DC LXXX VI an

Fig. 2.

The Chinese Abacus from the Chinese Dictionary containing 9 places or Degrees.



一 二 三 四 五 六 七 八 九

Fig. 4.



Turn this Rundle under A. and 123 etc. will appear through the hole a cut out and 30 31 through the hole b.



ie pã kiêu xẽ xẽyẽ xẽ lh' xẽ sãn xẽv

Ⅱ Ⅷ Ⅷ X XI X Ⅱ X Ⅲ XV

u' xẽ v xẽ lỏ xẽ ẽie xẽ pắc xẽ

Ⅲ Ⅳ Ⅴ Ⅵ Ⅶ Ⅷ Ⅸ Ⅹ Ⅺ Ⅻ Ⅼ Ⅽ Ⅾ Ⅿ

XXXX L LX LXX LXXX

su' pẽ ẽien lh' ẽien sãn ẽien vãn sãn vãn

Ⅳ Ⅴ Ⅵ Ⅶ Ⅷ Ⅸ Ⅹ Ⅺ Ⅻ Ⅼ Ⅽ Ⅾ Ⅿ

400 • 1000 2000 3000 10000 30000

lỏ niẽn v yuẽ xẽ sãn gẽ

Ⅳ Ⅴ Ⅵ Ⅶ Ⅷ Ⅸ Ⅹ Ⅺ Ⅻ Ⅼ Ⅽ Ⅾ Ⅿ

VI annus V mensis XIII Die

Ⅳ Ⅴ Ⅵ Ⅶ Ⅷ Ⅸ Ⅹ Ⅺ Ⅻ Ⅼ Ⅽ Ⅾ Ⅿ

Fig. 1.

ã chĩ tam jo vãm tiẽn yuẽn yeu

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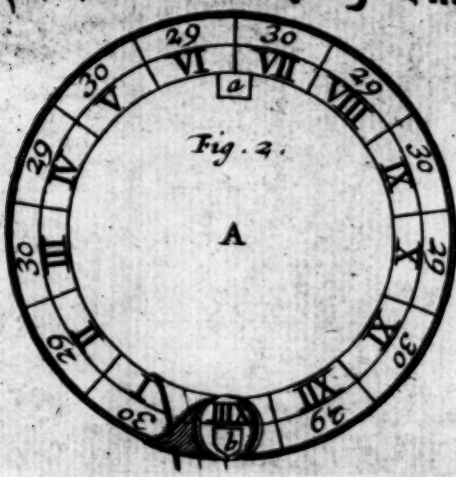
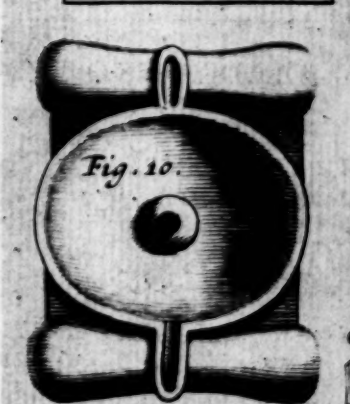
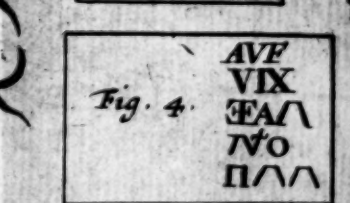
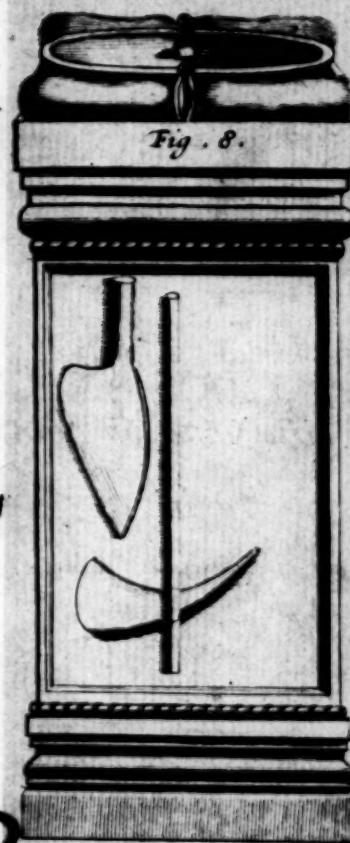
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I. O. M
DIS. DE. ABVS. QVE
HOSPITALIBVS. PE
NATIBVS. QOB. CON
SERVATAM. SALVTIEM
SVAM. SVORVM. Q
PAEL. MARCIAN
VS. PRÆ. COH
ARAM. SAC. F. NC. D

Fig. 5.



Fig. 11.

IS MAR
B PRO SALV
EM RE
ANTONINI
AVG IM

L V BEN SM
OBREDITV

Fig. 14.

EC COL. M GLEV
XIANLXXXVI

Fig. 15.

VRN
IOP

Fig. 16.

IVSSA
SVXSO

Fig. 17.

ILIA
LIA



Fig. 12.

FORTVNAE
COHTRATAVOR
CVIPRAEEST
MELACCINIVS
MARCELIVSPRE

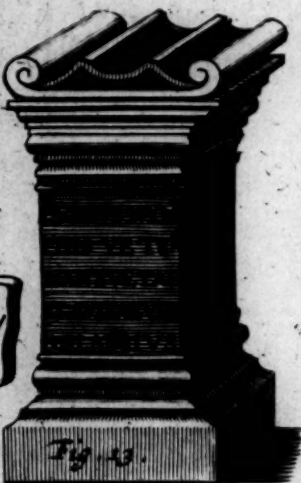


Fig. 13.

FORTVNAE
CONSERVA
TRICI
L SENECIA
NIVSMAR
TTVS LEG
VI VICT

Fig. 21.

D Fig. 18. M
SVCCPETRONIAEVX
ANIMMIDIXVDO
MXLVSEVICISARINA
FIL KAR FEC

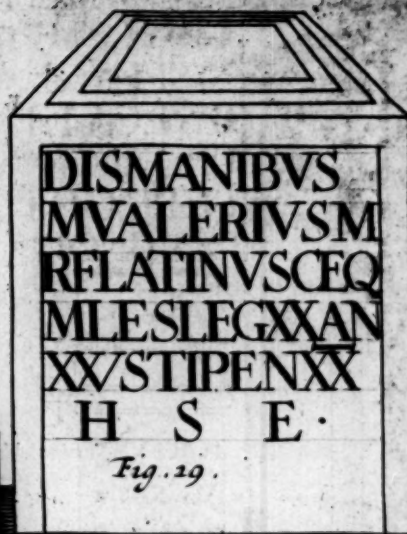


Fig. 19.

DISMANIBVS
MVALERIVSM
RELATINVSCEQ
MLE SLEGXXAN
XXSTIPENXX
H S E.

CMVRRIVS
CFARNIENSIS
FOROIVLIMO
DESTVSMIL
LEG IIADPF
IVLISECVNDI
ANXXVSTIP
H

Fig. 20.

IMP. CAES. MNT
N' SP. FAG. B. L. N.
BASICA. L. IN
PRENI. CLAN
PR. PR. CRIT. E.
QVIRINOPREC



Fig. 22.

FORTVNAE
AG. SACR.
PAFIAT TI
CVS SRAFI
VA S L. M.

MAR
TT
DEO
VII

LE
XX
FI



Fig. 24.

MIM

Fig. 26.

TIAN

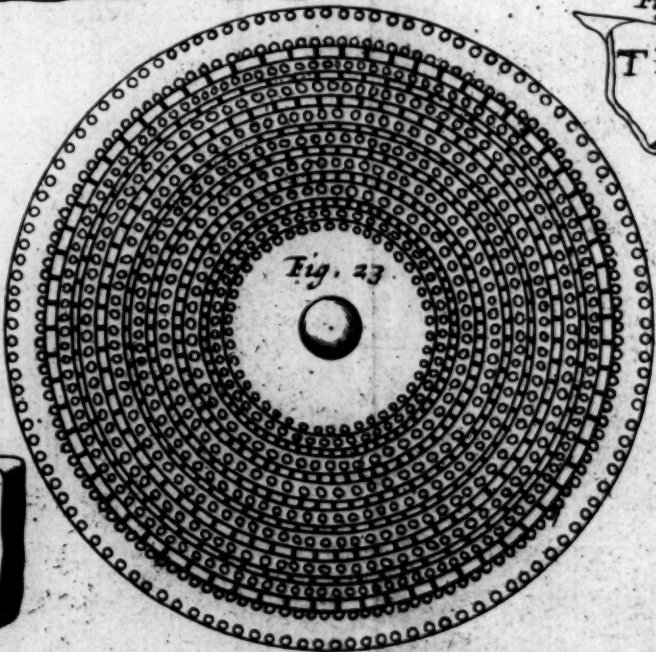


Fig. 23.

ENT GORDIA
BLNE MCVM
9 IN TRVXT
LAN MLE AG
RTE MAVR
PRECHILGR

MAR
TT
GENIO PRAETORI
CLEPAREODITVS
CLAVDIANVS
TRIBVNVS CHO
ILLING VLPM
DEO
VII
COHT



LEG
XXV
FEC

Part 2, Vol. 3, Plate 2.

Pag. 442.

Fig. 28.

- Revers*
- I
ÆDELSTAN RE+ { P NE
+ + + (b)
FEHO
 - II
ÆDELSTAN RE+ { LAND
+ + + (c)
VEHO
 - 3 *wt. 23 grains*
ÆDELSTAN RE+ { STEF.
+ + +
ANVS
 - 4 *24 gr.*
ÆDELSTAN RE+ { AREM
+ + + (d)
ONETA
 - 5 *21 gr.*
EADMVND RE+ { 3 BEN
+ + +
DICTVS
 - 6 *16 gr.*
EADMVND RE+ { MAN
+ + +
ANO
 - 7 *19 gr.*
EADHVND RE+ { ALB
+ + + (f)
ERING
 - 8
EADMVND RE+ { IVEH
+ + +
NETA (g)
 - 9
EADMVN RE+ { HTIL
+ + + (h)
HAH
 - 10 *24 gr.*
EADMVND RE+ { MERA
+ + +
ATNO
 - 11
EADMVN RE+ { LITIL
+ + +
WAN
 - 12
EADMVND RE+ { MAN
+ + +
MANO

- 13
EADMVND RE+ { E RH
+ + +
HO
- 14
EADHVND REPT+
Edmundi facies
REIHGRHZIOH
- 15
EADMVND RE+ { E RH
+ + +
HO
- 16 *24 gr.*
EADHVND REX { INGEL
+ + + (l)
GARH
- 17 *25 gr.*
EADHVND RE+ { GOTAE
+ + + (k)
HOIE
- 18 +EADRED RE+ *21 gr.*
Edredi facies
FREDRED MONETA+.
- 19 +EADRED RE+
Edredi facies (m)
MANEEH INNO+
- 20 +EADRED
Edredi facies
ZPERLINL UONE
- 21 +EADRED REX *24 gr.*
Edredi facies
HHECHINONE (m)

Fig. 25.
M/79



IANIM



Fig. 27.



Fig. 29.



Fig. 30.



7y D
Nicks
p. 464.

Will o
lury.

XXXII. *July 11, 1685, We Olivier Estienne, an Advocate in Parliament, Subdelegated by Monseigneur de Marillac, Councillor of State in Ordinary, having the Conduct of the Works that are making upon the River of Eure, below the Village of Passy, do Certify, That upon the Petition of Messire Robert, Prevost of Cocherel, Knight and Lord of the Mannor of the Upper and Lower Cocherel, We having with us several Witnesse, did come to the said Town, and from thence to a Piece of Land call'd les Hautberges. Where being come, the said Lord of the Mannor of Cocherel did Remonstrate unto us, That having Occasion for a considerable Quantity of Freestone, he had caused two great Stones, which appeared in this Place above Ground only as two Limits or Bounds, the one about a Foot, the other about 8 or 9 Inches, to be further uncover'd, and, That they had been found to be 6 Foot High, and about a Foot and a half Thick; Marked in the Figure of the Sepulchre A and B; the Breadth of the one marked A of 3 Foot, and the other marked B of 2 Foot and an half, set Endways by one another; and they had further observ'd, that it was an Ancient Sepulchre, that only on 3 sides, viz. at one End, at the Head, by the two Stones already mention'd, on the Right Side by a Stone placed Edge-ways upon its thickness of about 14 Inches, and being above 5 Foot and an half long, and about 3 Foot broad, touching in a Right Angle. The Stone marked B at the Head; and at the Feet another Stone was set, marked D, of the same Thickness as the precedent, and about 4 Foot square; all these Stones were Cemented together with Mortar made of the Chalk or Marle taken out of the same Hole, mingled with little Stones or Gravel.*

The Verbal Process upon the Discovery of an Ancient Sepulchre found in France; Communicated by Mr Justell. n. 185. p. 221.

Fig. 31.

That in this Sepulchre were found the Bones of about 20 Bodies of Men of the Ordinary Stature, between 5 Foot and a half, and 6 Foot, except 2 Youths of about 15 or 16 Years Old; all these Bodies lay extended North and South, the Arms along the Bodies, and the Heads all placed along the two Stones A, B. In the Right Angle there were 2 Bodies separated from 2 others by the Stone E, of about a Foot Thick, 4 Foot Broad, and 5 Foot and a half Long, that lay in the manner of a Tomb-stone upon the two Bodies underneath. All these Heads had very fair sound Teeth in them, and the Cranium and other Bones of the Head, were much stronger and thicker than those of ordinary Heads; which argues them to have been of Strong well Constitution'd Men; amongst them all there was not any Woman's Head.

In proceeding still to examine the Sepulchre, we did observe, that at the same distance from the Superficies of the Earth, and from those Bodies thus Bury'd, there was 3 little Earthen Pots, of about 4 Inches Diameter, and between 4 and 5 Inches high, of a black Earth as soft as Wax; which could not be separated from the other Earth without Breaking them; and the Pieces being come into the open Air, turn'd of a Greyish Colour and grew Hard: These Pots were full of Wood Coals and Ashes, which were not much examin'd.

All these large Stones of the *Sepulchre* were Rough, and had not been Cut, but seem'd to have been fetch'd from a Neighbouring *Quarry*, which is about 400 *Foot* off, upon the same Hill.

We observ'd besides, that in the place where were laid the two Heads of the Bodies that lay upon the *Tomb-stone E*, there were found 2 Stones: The one whereof was about 6 Inches long, and some 15 Lines broad in its broadest place, and about 4 Lines thick; fram'd like the Head of a Pike, very sharp and cutting at both Ends and on the Sides; it was a *Yellow Flint*, of which the best Firelock-Stones are made, being almost as hard as an *Agat*. The other Stone, which was likewise under one of these Heads, was shap'd like the Head of an *Axe*, about 4 Inches long, and 3 Inches broad, having a Hole at the narrowest End, and about 6 Lines thick, very sharp, and of a greenish Stone, spotted with white Spots, as hard as *Agat*: The *French Lapidaries* call it *Pierre de Jade*, for the *Nephritick Stone*.

Under the two Heads which were under the *Tomb-stone E*, there were also found two other Stones; the one much of the same Nature with that first describ'd, but something longer, and the sharp End a little dull'd. The other was likewise in the Shape of an *Axe Head*, very sharp and cutting, of about 3 Inches long, and 2½ broad, and 6 Lines thick, with a Hole in it at the narrow End: The Stone was of a dark green Colour, which the *Lapidaries* call, *Oriental Serpentine*.

On the Left side of the *Sepulchre*, which was open, there were 16 Bodies in the same Situation as the first, placed *North* and *South*, their Heads along the great Stone *A*, and the Arms extended along the Bodies, the Bones all Entire, though they appear'd very Ancient, and after two Days lying in the Air fell all to Dust.

All the Bones of these Heads, as has been said before, were very Thick, there was one that had been pierced by some Blow, and Nature had repaired the Wound; within, the Hole was Round, as having been made by some Sharp Round Weapon, which argued likewise the Wounded to have been a Soldier. Under every one of these Heads, there was a little Stone: Two were round, one of a reddish Colour, of about an Inch thick, having a Hole at each End, which lessen'd and grew narrower towards the middle. Another of Chestnut Colour, and about the bigness of a Chestnut, made in the Shape of a Coat-Button, with a Hole clean through it, but Roughly Polish'd and Hard, seeming on one side to have suffer'd by the Fire.

There were likewise two other little Stones, which, according to probability, were under the Heads of the Young Bodies; whereof one was about 2 Inches long and 8 Lines broad, and 2 Lines thick, pretty sharp at the broader End, and having a Hole at the narrow End: It is thought to be of the same *Pierre de Jade*, Green and White, but 'tis nothing near so hard as the First. The other Stone was about 17 Lines long, 8 broad, and 2 Lines thick, somewhat sharp at the broad End, and having 2 Holes at the narrow End, the one bigger than the other: 'tis thought to be of a *White Marble* or *Alabaster*.

There were moreover found under these Heads 3 Stones, whereof Two were of a *Gray Pebble*, such as we find by the Sea-side, shaped like *Axes Heads*, Sharp and Polish'd, about 4 or 5 Inches long, and 4 broad at the broadest End, about 1 $\frac{1}{2}$ Inch at the narrowest, and in the Middle about an Inch thick. These Stones were by their narrow End to be put into a piece of *Stag's Horn* fitted to receive them, as appear'd by several pieces found in this *Sepulchre*, which had an Oval Hollow at the end, to receive one of these Stones; these pieces were about 6 Inches long, and had a Hole at the other end by which they might be fasten'd to a longer Stick. The 3d Stone was of the Shape of the precedent, but of a *black Pebble* like a *Flint*, of which this Country is very full; and it was besides remarked that the pieces of *Stags Horn* were worn at the End, and Polished upon some Stone, but not cut with Iron.

Under all the other Heads there were 10 little Stones like *black Flint*, one under each Head, cut all in the same Shape, smooth on one side, and sharp on the other; 'tis thought they might use them as *Knives*.

There was likewise found in the same place, under one of the Heads, a Stone, which within was of *black Flint*, having the Outside of a white Substance, as that sort of Stone uses to be; this had two Eminences like Teeth, which we took to be Natural, and not Artificial. All these Stones thus placed under their Heads shewed that they had them in great Esteem.

Amongst these dead Bodies has been also found some Bones sharpen'd, to put at the End of a Stick, or at the End of an Arrow; one was of the smaller Bone of a *Horse's Leg*, and the other was made of the sharp End of the *Andouilleres* of a *Stag's Horn*.

Amongst all these Stones, there has been found no sort of *Inscription*, *Sculpture*, or *Character*, either in *Relievo* or otherwise, which might oblige us to think that these Men had any knowledge of *Christianity*; but rather that they had some *Idolatrous Superstition*, as these Stones seemed to indicate. Wherefore we thought fit to declare to the said Lord of the Manor of *Cocherel*, that he might without Scruple use these Stones for what he thought fit.

Since the Expedition of the present *Verbal Process*, there having been further Digging on the Left side of this *Sepulchre*, it has been discovered that the bottom of the *Sepulchre* was raised, and not so deep by a *Foot* and a half as that part where the Bodies were bury'd. And it is perceivable that in this Place several Bodies have been burnt, whose *Ashes*, and burnt *Bones*, have been thrown confusedly into this Hole: and 'tis observable, that all along the *Sepulchre*, there is a Vein of *Coals* and *Ashes*, which runs about 2 *Foot* below the Superficies of the Earth, and all these *Ashes* and *Bones* are under this Bed of *Coals* and *Ashes*, which are so Salt and Pungent, that they make one sneeze: and when these *Bones* are handled, they produce a Tingling in one's Fingers End, as if one had Handled the Sharpest *Salt-Petre*.

It seems difficult how to reconcile the 2 Ceremonies of *Burying* and *Burning*, except that we should say, there has been a Fight in this place between the
Gauls,

Gauls, and some *Barbarous Nation*, who had invaded them: that the *Gauls* have Burnt their Dead, and Sacrificed to the *Manes* of them their Prisoners taken in War, whom they Bury'd with the Ceremonies proper to those *Barbarians*, the Thickness of whose *Skulls* shew that they went Bare-Headed, and their *Arms* shew that they had not the Use either of *Iron* or *Brass* to make *Arms* of, but used such as Nature afforded first, as some *Indian Nations* do Now.

The Figures of
several Antiqui-
ties; by
n. 175. p. 1159.
Fig. 32, 33,
34, 35, 36, 37,
38, 39.

XXXIII. 1. Fig. 32. A Ring of *Corinthian Brass* with a Vizard of *Silenus* in a *Sardonix*.

33. An *Amulet* of the *Gnosticks* cut in a *Chalcedonian*, the Names of cer-
tain *Aeons* or *Intelligences*.

34. A *Tessera* of *Chrystal*, having on one side *XIII*, on the other *IA*.

35. A *Fortune* and a half *Diana* in an *Onyx*.

36. An Ancient Picture of the *Virgin* in a *Chalcedonian*.

37. A *Cameus*, with a Mixture of several *Gods*.

38. An *Onyx*.

39. A *Gla's Lachrymatory*.

By
n. 176. p. 1201.
Fig. 40, 41,
42, 43, 44, 45,
46, 47, 48, 49,
50, 51, 52, 53,
54, 55, 56, 57,
58, 59, 60, 61.

2. Fig. 40, 41, 42, 43, 44, 45, *Res Turpicula*, or *Priapi*, worn by
Roman Children against *Fascination*.

46, An *Egyptian Brass Serapis*, or
Teraphim. 47, A *Brass Stilus Scriptorius*. 48, 49, Old *Roman Keys* of

Brass; one being a Ring to wear on a *Woman's Finger*. 50, An *Iron Die*,

or *Alca*. 51, A *Flat Iron Die*, or *Talus*; upon the narrow Sides are 6.

5. 2. and 1. 52, A *Roman Iron Ring*. 53, An Old *Roman Brass Ring*,

marked *XXXV*, for a *Slave* to wear. 54, A *Brass Roman Ear-Ring*. 55, A

Brass Lunula, or *Meniscus*. 56, A *Brass Fibula*. 57, 58, 59, 60, 61,

Ancient *Pasts*, or *Opaque Enamels* of divers Colours, for *Pavements*, taken
up at *Baia*.

An uncommon
Inscription on a
very great Basis
of a Pillar lately
dug up at Rome
by M. Adrian
Auzout.
n. 183. p. 172.

XXXIV. This *Inscription* was Copy'd from the Stone by M. *Adrian Au-*
zout, and sent by him to M. *Jufel*. It is Threelfold upon 3 Sides of the
Basis, as follows:

P. SVFENATI. P. F. PAL. MYRONI
EQVITI. ROMANO. DECV
RIALI. SCRIBARVM. AEDILI
VM. CVRVLIUM. LVPERCO. LAVRENTI
LAVINATI. FRETRIACO NEAPOLI. ANTI
NOITON. ET. EVNOSTIDON. DE
CVRIONI. IIII. VIRO. ALBA
NI. LONGANI. BOVILLEN
SES. DECVIRONES OB ME
RITA EIVS L. D. D. D.

P. SVFE

P. SVFENATI. P. F.
 PAL. SEVERO. SEMPRO
 NIANO. DECVRIALI
 SCRIBARVM. AEDILIVM. CVRV
 LIVM. FRETRIACO. NEAPOLI. EV
 NOSTIDON. DECVRIONI. ET
 SACERDOTI. APOLLI
 NIS. ALBANI. LONGA
 NI. BOVILLENSES. DE
 CVRIONES. OB. MERI
 TA. SVFENATIS. HER
 METIS. PATRIS. EIVS
 L. D. D. D.

P. SVFENATI. P. F.—
 MYRONI.
 EQVITI ROMANO, DEC—
 ALI. SCRIBARVM. AED—
 CVRVLIUM. LVPERCO—
 TI. LAVINATI. FRETRIAC—
 APOLI. ANTINOITON—
 NOSTIDON. DECVR—
 III. VIRO. ALBANI—
 GANI. BOVILLEN—
 MVNICIPES. OB.
 EIVS. L.— D.—

2. Bene nosti *Classem Egyptiacam* sive *Catapulum Alexandrinum* ante-
 quam Portus *Ostia* esset exstructus, singulis Annis appulisse *Puteolos*, unde
 demum Frumentum *Romam* deferabatur. Postquam vero *Augustus*, & *Claudi-*
us Caesares & postea *Nero Ostia* Portum aperuerunt, jam *Annona* non tantum
Puteolos, sed & longe maxima sui parte *Ostium* appetebat. Constat autem
 tempore *Tiberii* pulsos *Romam* fuisse *Judeos* & *Egyptios*; unde factum est
 ut ab *Ostia* per *Agrum Laurentem* deportaretur Frumentum *Ariciam* & *Al-*
bam Longam usque ad *Bovillas*, ad Decimum nempe ab Urbe Lapidem;
 neque enim longius progredi permittebatur. A *Bovillis* enim *Romam*
 per *Institores Romanos* deferabatur. Neque enim *Egyptiis* aut *Judeis*
 in Urbe habitare aut *Horrea* habere erat licitum. Mensoribus vero & Ven-
 ditoribus Frumenti *Ostia*, & passim alibi, praefuisse *Decuriones*, & hoc quo-
 que ex Jure constat. Sed vero omnibus istis minoribus *Decurionibus*, qui in
 singulis Locis & Urbibus Frumenti Curam haberent, praefuisse alium *Decu-*
rionem,

Explained by
 Dr. Voisin. lb.
 p. 174.

tionem, qui vicem *Præfetti Annona* obiret, & in omnibus istis Inferiorum *Decurionum Collegiis* Primum teneret Locum; id Manifeste ex hac patet *Inscriptione*, ubi Minores *Decuriones Bovillani* Honorem faciunt *Equiti Romano* & *Palatino*, qui *Decurio* seu *Curialis* & *Freriacus* in omnibus esset Locis & Urbibus, a quibus & per quas *Annona Egyptiaca Romam* devehebatur. *Decuriones* vero promotos fuisse ad Honorem *Sacerdotis* ita ut simul *Flamines*, *Luperci*, *Epulones Jovis*, & *Parasiti* fierent *Apollinis*; & hoc quoque multis constat Exemplis. Omne verò dubium tollit, quod in hac *Inscriptione* *Eques ille Romanus* vocetur *Antinoiton* & *Eunostidon Decurio*. *Antinoi* enim Urbs præcipua tum temporis *Egypti Superioris* erat Civitas, unde per multas Fossas Frumentum deferabatur ad *Mareotin Lacum*, qui ad *Eunosti Portum* Exit in Mare. Ab hoc Portu dicti *Eunostide* Curatores Frumenti *Egyptiaci*; unde demum Confectus de Dec. *Eunostus* Rei Frumentariæ Inspector, qui huic præsideret Portui.

An Ancient
Sepulchre near
Rome; by . . .
n. 185. p. 227.

XXXV. In an Inundation of the *Tiber*, A. 1686, the Water having pierced a strong thick Wall which joyn'd to a great Country Palace about 2 Miles from *Rome*, and passing under the same, broke out at a Corner of an *Aqueduct* by the said House, where there was found a small Vault of an Oval Figure, in which there was a Stone *Sepulchre* pretty Large, with the following *Inscription* P. M. R. C. cum Uxore . . . and more which could not be Discern'd; By this same there was a great Earthen *Urn* shut up very close, which being opened, there came out a strong Smoak, that it made the Man that was by it almost giddy; the Smell was like *Bitumen*, but being quickly Dispersed, they found in the bottom of the said *Urn* an Earthen Pot made up as a *Lamp*, full of a *Materia Oleosa*, which by degrees, as the Cold Air got into it, grew Hard. Several Persons suppose this to be one of those perpetual *Lamps* that the Ancients mention.

An Etruscan
Inscriptions by
Mr. Oflavian
Pulley, n. 228.

XXXVI. I here send you an *Inscription* on an Old *Urn*, in the *Etruscan* Language; The Character seems to be not much unlike the *Runic*. Vid. Fig. 62.

p. 539.
F g 62.
The Catacombs
at Rome; by
Mr. J. Monro.
n. 265. p. 643.

XXXVII. The *Catacombs* at *Rome*, are a narrow *Gallery* Dug, and carry'd a vast way under Ground, with an Infinite Number of others going off it on all hands, and an Infinite Number of little Rooms going off the Principal and them too. Those commonly shewed Strangers are those of *San Sebastiano*, those of *San Lorenzo*, those of *Sant Agnese*, and the others in the Fields a little off of *Sant Agnese*. They take their Names from the Churches in their Neighbourhood, and seem to divide the Circumference of the City without the Walls between them, extending their *Galleries* every where under, and a vast way from it, so that all the Ground under, and for many Miles about it, is said to be Hollow. I have also seen those at *Naples*; and as they say, there are *Catacombs* in the Neighbourhood of all the great Towns of that part of *Italy*.

Some Authors will have them made by the *Primitive Christians*; adding, That in the times of *Persecution*, they Lived, held their Assemblies, and laid up the Bodies of their Martyrs and Confessors in them. This is the Account that prevails at *Rome*, and consequent to it there are Men kept constantly at Work in them. As soon as those Labourers discover a *Repository*, with any of the Marks of a *Saint* about it, Intimation is given to the *Cardinal Treasurer*, who immediately sends Men of Probity and Reputation to the Place; where they find a Palm painted or engraven, or the Cypher Xp. which is commonly read *pro Christo*, or a small round Projection in the side of the *Gallery*, a little below the *Repository*, what is within it is carry'd to the Palace. Many of these Projections we have seen Open, with pieces of the Vials in them; the Glass indeed was Tinctured, and 'tis pretended that in these Vials was conserved the Blood of the *Martyrs*, which was thus laid up nigh their Bodies, towards their Head, to distinguish them from those of the Others that were not call'd to the Honour of laying down their Lives for the Faith of the Gospel. After the Labourers have survey'd a *Gallery*, they do up the Entry that leads into it; thus most of them are shut; nor are more left open than what is necessary to keep up the Trade of shewing them to Strangers. But to this Opinion it may be justly excepted, that allowing the *Catacombs* to be proper for the End for which they are presum'd to be made, and that the *Christians* of that Age were in a Capacity of making that Convenience, for themselves to Live and Assemble in Below Ground, at a Time when 'twas so very unsafe to Appear Above it; yet to suppose that a Work of that Vastness and Importance could be carry'd on without the Knowledge of the Government, is to suppose the Government asleep, and that that was actually done under its Nose, that must necessarily have alarm'd it, had it been attempted on the Frontiers of the Empire.

Another sort of Authors represent them as a Work of that Vastness, that the *Christians* in the Persecuting Times had not Number enough to carry it on; but then most unadvisedly confound them with the *Puticuli* in *Festus Pompeius*, where at the same time that the Ancient *Romans* used to burn the Bodies of their Dead, the Custom was, to avoid expence, to throw those of the *Slaves* to Rot. The *Roman Christians* (say they) Observing at length the great Veneration that certain Places gain'd by the presence of *Relicks*, resolv'd to provide a Stock for themselves; entering therefore the *Catacombs*, they made in some of them what *Cyphers*, what *Inscriptions*, what *Painting*, they thought fit, and then shut them up; intending to open them again upon a Dream, or some other important Incident. The Few that were in the secret of this Artifice either Dying, or as the *Monks*, who were the only Men that seem to have Heads adapted to a thought of this Quality, were subject to many Removes, being transported to other Places the Contrivance came to be forgot, and those *Galleries* continu'd shut, 'till Chance, the Parent often of great Discoveries, Open'd them at last. Thus they conclude, the Remains of the vilest part of Mankind are Trump'd up in the Church for the Bodies of the most Eminent *Confessors* and *Martyrs*.

But surely either the *Catacombs* are not that great Work they are represented to be, nor to be found every where about the City, or 'twas very improper in *Festus Pompeius* to call them by the little Name of *Puticuli*, and to confine them to one Place only, that I mean unknown now without the *Esquilin-Gate*. The True Notion of the *Puticuli* is this, Holes Dug perpendicularly in the Ground to throw Bodies Indifferently and without any Decency in; and this was the Conduct of the Ancient *Romans* with respect to their *Slaves*, as Implying Simplicity and the care to avoid a greater Expence. After the same manner when the *Persecutors* spilt the Blood of so many *Martyrs*, they used to dig Holes perpendicularly in the Ground, and to throw the Bodies promiscuously in them: and of this the Memory is still conserved, Churches being Built in the Places where the Holes were made, and little *Monuments* erected over the Holes themselves, to which the Name of *Putei* is continu'd to this Day. But what is all this to the *Catacombs*, where *Repositories* are cut, in the Face of a long *Gallery*, one over another, sometimes to the Number of 7, in which Bodies were singly laid, and handsomely done up again, so that nothing cou'd offend the View of those that went in, especially with the little Rooms of the fashion of *Chappels*, that have all the Appearances of being the *Sepulchres* of People of Distinction; And if they were kept in better Repair, they would be, without dispute, the *Noblest Burying-Place* this Day in the World.

As often as they fall under my Consideration, I cannot forbear thinking they were made for This End by the Ancient *Romans*, and made in consequence of those two Ancient Opinions, That the *Shadows* hate the Light, and love to hover about the Place where the Bodies are laid: they appear so Easy and Decent a resting place for the one, without the least fear of being ever Disturbed, and at the same time, there is provided a Noble and Vast Convenience full of Variety for the others, to Solace themselves freely, and with pleasure in.

I think 'twill not be Deny'd, that laying up the Bodies in *Caves* was the Original way of disposing of the *Dead*; this was that of the *Phœnicians*; and as they were the Men that with their Colonies Peopled the *Western Parts* of the World, 'tis more than probable they carry'd it along with them whithersoever they went. Afterwards as Men grew Great and Powerful, they Erected Noble and Magnificent *Monuments* for themselves Above Ground; at length others of Inferior Degree imitated them, all leaving Room enough, and Excluding the Light. But then *Interring*, as we do now, in the Open Air, or in Temples, was never the manner till *Christianity* brought it in. Of the whole we have many Instances, and *Il Signior Abbate Bencini*, *Bibliothecary* of the *Propaganda*, a Gentleman of good Ancient Learning, assured me, in the Conversation I had with him on this Argument, that on the great Roads in most parts of *Italy* little *Catacombs* have been and are still found Under Ground, and that 'twas the Custom to build little Houses over them. And as to the Marks of a *Martyr*, he added that they do not conclude much; that the so fam'd Cypher Xp was in use among the Ancients long before *Christianity* began, and that it was composed of the

two Greek Letters X P, under which something *Mystical* was Comprehended; but that he met with no Author that gave Account what the *Mystery* was.

Thus after a Multitude of Thoughts about the *Catacombs*, I am forc'd to take up with this; so Natural it is, arising from the sole Theory of the Place, and falls in so appositely with the Religion and Practice of the Ancients, among whom the *Dii Manes* were the *Tutelary Gods* of the Country, and D M. at the Head of an *Inscription* argues the *Moles*, the *Sepulchre*, the *Momument*, &c. was in the Primary Intention made for and Dedicated to the *Soul*. Upon the same Maxims, in Foreign Expeditions, when a Hero dy'd or was kill'd, as the Body was liable to a quick Corruption, and for that Reason unfit to be Transported entire, they fell on the Expedient of *Burning*, in order to bring home the *Ashes*, to oblige the *Manes* to follow, that so the Country might not be depriv'd of the Benefit of its *Tutelage*. This I humbly conceive was the Original of *Burning*, which by degrees became more and more Universal, till at last the Pomp and Magnificence of it reconciled it to all that were able to go to the length of the Expence. As for the prejudice of the *Silence* of the *Ancient Authors* in this Matter, 'tis easily Remov'd, and to be Regretted at the same time, that the Authors of all Ages too much neglect the Customs of their own Time. Writing for the Satisfaction of their Contemporaries, they think it Impertinent to trouble them with the Account of what they see transacted every Day. By this Means the Ancient Customs, with the Time and Reasons of their Disuse, are lost with respect to us; and ours, with the same Circumstances, may come to be so with relation to Posterity.

Upon the whole matter, the *Catacombs*, I humbly conceive, were the *Burying-Places* of the Ancient Romans; at Length the manner of *Burning*, which they receiv'd from the *Gracians*, coming by Degrees to Prevail universally; they fell under a Total neglect. This is the State in which the *Primitive Christians* must be suppos'd to have found them. And therefore here they Laid up the Bodies of their Dead: and perhaps when the *Persecution* was hot, conceal'd themselves, and kept little separate Assemblies in their Chambers. At last the Empire turning *Christians*, they fell again into the old state of Neglect, in which they continu'd till, upon the Reading of, I have forgot what Author that makes mention of them, they came to be Look'd into and Search'd.

What I have writ relates to the *Catacombs* of *Rome*, those of *Naples* are a quite other thing.

XXXVIII. I set out from *Venice* [in 1675] with those Gallies which carry'd Their Ambassador that went for the *Port*. We touch'd at most of the considerable Towns of *Istria* and *Dalmatia* by the way. In *Istria* we saw *Pola*, an ancient Republick. There remains yet an *Amphitheater* Entire: It is of Two Orders of *Tuscan Pillars*, plac'd one over another, and the Lower Pillars stand on *Pedestals*, which is not Ordinary; for, commonly they have nothing but their *Bases* to support them. There is, besides a

*Observations
in a Voyage from
Venice to Smyrna;
by Mr. F.
Vernon. n. 124.
p. 575.*

Temple Dedicated to *Rome* and *Augustus*, a *Triumphal Arch*, built by a Lady of the Family of the *Sergii*, in Honour of some of her Kindred, which commanded in those Countries; besides several *Inscriptions* and *Ancient Monuments* which are in divers parts of the Town

In *Dalmatia*, I saw *Zahara*, which is now the *Metropolis* of the Country. It was Anciently call'd *Jadera*. It's now very well Fortify'd, being encompass'd on 3 Sides with the Sea, and that part which is toward the Land extremely advantaged by all the Contrivances of Art, having a *Castle* and a *Rampart* of very Lofty *Bastions* to guard it. I found here several *Ancient Inscriptions*. We pass in Sight of *Zebenico*, and saw 3 *Forts*, which belong to the Town, *St Nicholo*, *St Gionni*, and *La Fortezza Vecchia*. That which is most worth seeing in *Dalmatia*, is *Spalatro*; where is *Dioclesian's Palace*, a vast and stupendious Fabrick, in which he made his Residence, when he retreated from the Empire. It is as big as the whole Town; for the whole Town is patcht up of its Ruins, and is said by some to take its Name from it. The Building is Massive; there is within it an Entire Temple of *Jupiter* Eight-square, with Noble *Porphyry Pillars*, and *Cornice*, worth any Body's Admiration. There is a Court before it, adorn'd with *Egyptian Pillars* of that Stone, call'd *Pyropoicilos*, and a Temple under it, now Dedicated to *Sta. Lucia*; and up and down the Town several Fragments of *Antiquity*, with *Inscriptions* and other things, worth taking notice of.

Four Miles from *Spalatro* is *Salona*, which shews the Ruins of a Great Town. About as much farther from *Salona* stands *Cliffa* upon a Rocky Hill, an eminent *Fortress* of the *Venetians*, which is here the Frontier against the *Turk*; from whence they Repuls'd him in their Late Wars with great Honour. I was at *Lefina*, where is nothing very remarkable; but *Biondi*, that hath written our *English History*, was of it. *Trau* is Ancient, and hath good marks of its being so. Here I spoke with *Dr. Stafileo*, who put out that Fragment of *Petronius Arbitr*; and I saw his *Manuscript*.

I was in the Harbour of *Ragusa*, but not in the Town. From hence we pass the Gulf of *Budua*, and saw the Mountains of *Antivari*, the Plain of *Durazzo* and *Appollonia*, and came to *Saffino*, a small Island, from whence we could see the Town of *Kalona*, and the Mountains *Acroceraunii*, which are very near, and are now call'd Mountains of *Chimera*.

I stay'd a fortnight in *Corfu*, and had time to view the Gardens of *Alcinous*, that is, the Place where they are suppos'd to have been, now call'd *Chryside*, a most Delicious Scituation; The Ancient Port, now call'd *Νεορθάλασσα*; and several Foundations of Ancient Fabricks. In *Zante* I saw but little of *Antiquity*: What is *Modern* is very Flourishing, and the Island Rich and Plentiful.

I went from *Zante* to *Patras*, a Town in *Achaia*, of good Note among the Ancients. Near it is a great Mountain, mention'd by *Homer* by the Name of *Petra Olenia*. In the Town are several Massive Ruins, which few there know how to give an Account of. There are the Remains of a Large Church, Dedicated to *St. Andrea*, who, they say, was Martyr'd there. This is the first Town I saw on the Continent of *Greece*.

The

The Plain about it is very Fruitful, full of Springs and Rivulets; finely Wooded with *Olive Trees*, *Cypresses*, *Orange* and *Lemon Trees*. The *Citizens* here are counted amongst the Best of the *Turkish Empire*, and are sent for Presents to *Constantinople*. So are all their Fruits in very good Esteem.

In *Athens* I have spent 2 Months. Next to *Rome* I judge it the most worthy to be seen for *Antiquities* of any I have yet been at. The *Temple of Minerva* is as entire as the *Rotunda*. I was 3 Times in it, and took all the Dimensions, with what exactness I could; but it is Difficult, because the *Castle of Athens*, in which it stands, is a Garrison, and the *Turks* are Jealous, and Brutishly Barbarous, if they take notice that any Measures it. The Length of the *Cella*, or *Body of the Temple*, without-side is 168 Feet } These Measures you may rely on as Exact
the Breadth --- 71 } English } to 1 a Foot.

The *Portico* of the *Dorique Order*, which Runs Round it, hath 8 Pillars in Front, 17 on the Sides; the Length of the *Portico* is 230 Feet English, the *Fuste* or *Shaft* of the Pillars is 19 1/2 Feet in Circumference: The *Inter-columnium*, 1 1/2 of the Diameter of the Pillars.

The *Temple of Theseus* is likewise Entire, but 'tis much Less, though Built after the same Model. The Length of its *Cella* is but 73 Feet, the Breadth 26. The whole Length of the *Portico* which goes Round it, 123 Feet. 'Tis a *Dorique Building*, as is that of *Minerva*. Both of them are of *White Marble*.

About the *Cornice*, on the Outside of the *Temple of Minerva*, is a *Basso Relievo* of Men on Horse-back, others in Chariots; and a whole Procession of People going to a Sacrifice, of very Curious Sculpture. On the Front is the History of the Birth of *Minerva*.

In the *Temple of Theseus*, on the Front within-side the *Portico*, at the West-end, is the *Battel* of the *Centaurs*; and at the East-end, seems to be a Continuation of that History. But there are several *Figures* of Women, which seem to be *Pirithous's Bride*, and those other Ladies which were at the *Wedding*. On the Out-side the *Portico*, in the Spaces between the *Triglyphi*, are several of the Prowesses of *Theseus*, most in *Wrestling* with several Persons, in which he Excell'd: All his Postures and Looks are Express'd with Great Art. Others are *Monsters*, which he is made Encountering with, as the *Bull of Marathon*, the *Bear of Calydon*, &c.

There is a *Temple of Hercules*, a Round Fabrick, only of 6 Feet Diameter, but Neat Architecture. The Pillars are of the *Corinthian Order*, which support an *Architrave* and *Frise*, wherein are done in *Relievo* the *Labours of Hercules*. The Top is but One Stone, wrought like a Shield, with a Flower on the Out-side, which rises like a *Plume of Feathers*.

There is yet Standing the *Tower of Andronicus Cirrhestes*, which is an *Octagone* with the *Figures* of 8 Winds, which are Large, and of good Workmanship; and the Names of the Winds remain Legible in fair *Greek Characters*, (where a House which is built against it on one Side, does not hinder;) as ἀπληώς, εὐρος, βορέας, οὐείων, ζέφυρος, Each Wind plac'd against its

its Quarter in the Heavens; and the Roof is made of little Planks of *Marble*, broad at Bottom, and which meet all in a Point at Top, and make an Obtuse Pyramid of some 32 or 36 Sides. There is a Delicate Temple of the *Ionique Order* in the Castle, whether of *Pandrosos*, or whom, I cannot tell; but the Work was most Fine, and all the Ornaments most Accurately Engraven.

The Length of this Temple was 67 } Feet.
The Breadth ————— 38 }

The Pillars which remain of a Portico of the Emperor *Adrian*, are very Stately and Noble: They are of the *Corinthian Order*, and above 52 Feet in Height, and 19½ in Circumference: They are *Cannellate*; and there are now standing 17 of them, with part of their Cornice on the Top. The Building, to which they belong'd, I Measur'd the Area of, as near as I could conjecture; and found it near 1000 Feet in Length, and about 680 in Breadth.

Without the Town, the Bridge over the *Elissus* hath 3 Arches of Solid Stone-work: the middlemost is near 20 Feet Broad. There is the *Stadium* yet to be seen, whose Length I Measured, and found it 630 Feet, near to what the Precise Measure of a *Stadium* ought to be, viz. 625.

Towards the Southern Wall of the Castle, there are the Remains of the Theatre of *Bacchus*, with the Portico of *Eumenes*, which is near it, the Semidiameter, which is the Right Sign of the Semicircle which makes the Theatre is about 150 Feet. The whole Body of the Scene, 256. M. de la Guillotiere, in that Book he hath written of *Athens*, hath made a Cut of a Theatre, which he calls that of *Bacchus*, which is a meer Fancy and Invention of his own, nothing like the Natural one, which, by the Plan he has drawn of the Town, I judge he did not Know.

Thebes is a large Town, but I found few Antiquities in it, excepting some Inscriptions and Fragments of the Old Wall, and one Gate, which, they say, was left by *Alexander*, when he Demolisht the rest. It is about 50 Miles Distant from *Athens*, as I judge.

Corinth is two Days Journey Distant: the Castle, or *Ἀκρόπολις*, is standing, which is very Large. The Main of the Town is demolish'd, and the Houses which now remain, are scatter'd, and a great Distance from one another. So is *Argos*, which to go Round would be some 4 or 5 Miles, as the Houses now stand; but if they stood together, they would scarce exceed a good Village. *Napolo della Rumilia* is a Large Town, and full of Inhabitants, and the *Basha* of the *Morea* resides there: It is but a very few Leagues distant from *Argos*.

Sparta is quite forsaken; and *Mestra* is the Town which is Inhabited, 4 Miles distant from it. But one sees great Ruins thereabout; almost all the Walls, several Towers, and Foundations of Temples with Pillars and Chapiters demolish'd: A Theatre pretty Entire. It might have been Anciently some 5 Miles in Compass; and about a quarter of a Mile distant from the River *Eurotus*. The Plain of *Sparta* and of *Laconia* is very Fruitful, and Long, and well Watered. It will be about 80 Miles in Length, as I judge.

The

The Mountains on the West side of it, very High, the Higheſt I have yet ſeen in *Greece*; the *Maniotes* Inhabit them. But the Plain of *Calamatta*, which anciently was that of *Meſſene*, ſeems rather Richer.

Corone is very abundant in *Olives*. *Navarrino*, which is eſteem'd the ancient *Pylos*, hath a very ſtrong Caſtle, Fortify'd by the *Turks*, and is the beſt Port in all the *Morca*. *Alpheus* is much the Beſt River, and the Deepeſt, and with great reaſon extoll'd by all the Ancient Poets, and choſen for the Seat of the *Olympick Games*; for it's very Pleaſant. The Plains of *Elis* are very Goodly and Large, fit to breath Horſes in, and for Hunting; but not ſo fruitful as thoſe of *Argos* and *Meſſene*, which are all richer. The beſt Woods I ſaw in *Peloponneſus* are thoſe of *Achaia*, abounding with *Pines* and *Wild Pear*, the *Ilex* and *Eſculus-Trees*, and, where there runs Water, with *Plane-Trees*.

Arcadia is a very Goodly Champaign, and full of Cattel, but is all encompassed with Hills, which are very Rough and Unhewen. *Lepanto* is very pleaſantly ſeated on the Gulf, which runs up as far as *Corinth*; and without the Town is one of the fineſt Fountains I ſaw in *Greece*, very Rich in Veins of Water, and ſhaded with huge *Plane-Trees*; not Inferior in any thing to the Spring of *Caſtalia* on Mount *Parnaffus*, which runs through *Delphos*, except in this, that one was Choſen by the *Muſes*, and the other not; and Poetical Fancies have given Immortality to the one, and never Mention'd the other.

Delphos it ſelf is very ſtrangeſy ſituated on a Rugged Hill, to which you have an Aſcent of ſome 2 or 3 Leagues; and yet that is not a quarter of the way to come to the Pike of *Parnaffus*, on the ſide of which Hill it ſtands. It ſeems very Barren to the Eye; but the Fruits are very Good, where there are any. The Wines are Excellent, and the Plants and Simples which are found there, very fragrant and of great Efficacy.

About *Lebadia*, and all through *Baotia*, the Plains are very Fertile, and make amends for the Barrenneſs of the Hills which encompass them. But in Winter they are apt to be overflown for that Reaſon, and to be turn'd into Lakes; which renders the *Baotian Air* very Thick, and ſo were their Sculls too, if the Ancients may be believ'd concerning them; though *Pindar*, who was one that ſublimated Poetry to the Higheſt Exaltation, and is much fancy'd and Imitated in our Age, as he was much Admired in his Own, was Born there; And *Amphion*, who was ſaid to be ſo Divine in his Muſick, that he Ravish'd the very Stones, had Skill enough to entice them to make up the Walls of *Thebes*. So that not every Thing that's Born in a Dull Air, is Dull. Theſe Vales I found much Planted with Cotton, and *Sefamum*, and *Cummin*, of which they make great Profit and a great Trade at *Thebes* and *Lebadia*.

I went from *Thebes* into the Iſland of *Eubaa*, or *Negropont*, and ſaw the *Euripus*, which Ebbs and Flows much after the Nature of our Tides; only the Moon, and ſometimes Winds, make it Irregular. The Channel which runs between the Town, and a Caſtle, which ſtands in an Iſland over againſt it, is ſome 50 Feet Broad, and there are 3 Mills on it, which ſhew all the Changes and Varieties that happen in the Current. Near the *Euripus*

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VIII.

pus and opposite to the *Town*, they shew a *Port*, which they say was *Aulis*, and it is not Improbable, for it must be thereabouts. Between *Negropont* and *Athens* is a High Hill, call'd *Αγιομαντις*, formerly very Dangerous, but now guarded by *Albaneses*: It is part of Mount *Parnasse*; and near it on the Left Hand lies Mount *Pentelicus*, from whence the *Athenians* anciently fetch'd their Stone, and now there is a Convent of *Callovers* there, one of the Richest of all *Greece*.

In going from *Athens* by Sea, I Embarked in a *Port*, which lies just by *Munichia*: That which they call *Porto Pyrao* lies behind it, a Mile distant, which is a Large *Port*, able to contain 500 Vessels. There are the Ruins of the *Town* yet remaining, and of the *Walls*, which joyn'd it to the City of *Athens*. I sailed by *Porto Phalero*, the Ancient Haven of *Athens*, which is rather a Road than a *Port*. I saw an Island call'd *Φάληρος*, where the *Athenians* had Anciently *Mines*. I went ashore on the Promontory of *Sunium*, to view the Remains of the Temple of *Minerva*, which stood on it. Hence I Sailed among the Isles of the *Archipelago*, *Macronesia*, *Thermea*, *Serphanto*, *Siphanto*, till I came to *Melo*. From *Melo* I Sailed through the *Cyclades* to come to *Smyrna*. I pass'd by *Andros*, *Tenos*, *Mycone*, *Delos*, *Naxia* and *Paros* I saw at a Distance. We sail'd near the Northern Cape of *Sio*, and the Southern of *Mytelene* or *Lesbos*, and so came into the Gulf of *Smyrna*. Within this Gulf stands *Burla*, near some small Islands, which is judg'd to be the ancient *Clazomena*; *Foja*, which is the same with the ancient *Phoea*: Near this the River *Hermus* discharges it self into this Gulf.

A Voyage from
England to Con-
stantinople; by
Dr Tho. Smith.
m. 230. p. 527.

XXXIX. Aug. 3. 1668, We went on Board the *Bezan* Yacht for the *Downs*, where we arriv'd the next Day in the Afternoon, and went on Board the *Leopard* Frigat, Capt. O-Bryen Commander, appointed to carry Sir *Daniel Harvey*, his Majesty's Ambassador, to the *Port* of the Ottoman Emperor at *Constantinople*.

Aug. 9. We Sailed from the *Downs*, but were forc'd to an Anchor S. W. of the *South Foreland*: We carry'd a *Flag* upon our *Main-Top* after we came out of the *Downs*.

15. The Wind in the Afternoon at N. E. brought us by 7 of the Clock to the *Nesi*.

16. We were in the Morning athwart St. *Hellen's Point*, in the Isle of *Wight*.

17. In the Morning we got to the West of *Portland*; but about Noon, Sailing over part of the *Race of Portland*, where we met with a Tumbling Sea, we Anchor'd at N. W. Part in the *Bay*, over against the Point that looks towards *Weymouth*. We went ashore in the *Island*, which seems to be but one continu'd *Rock*; the Soil in several places not being above 5 or 6 Inches Deep, as I found by digging a Hole with my Knife: yet the Corn Flourishing enough. The *Castle* consists of a Double Fortification; we could not observe above 5 *Guns* Mounted. They told us, that in the *Island* there was but one *Church* and 4 Villages. We weigh'd at 12 of the Clock at Night: But 18. The Wind blowing fiercely at W. we could not Weather

ther the *Start Point* that Night. The Moon upon its first Emerging above the Horizon, seem'd to have a Colour like Burnt Brick, the Sky very cloudy : but some Rain falling, as she advanc'd Higher and Higher, she appear'd more and more Fiery.

19. We Weathered the *Start Point* by Noon: And the 29th we got into *Plymouth Sound*. The *Citadel* is built upon a Rock, with large *Counter-scarps* and *Bastions*.

20. We Weighed out of *Plymouth Sound*, and made the *Lizard*, a Promontory in *Cornwall*, before Night: The *Manacles*, several Rocks so call'd, we discern'd very distinctly, it being then Low-Ebb, as also the *Lands-End*. The Wind blew fresh; and we observ'd the Waves in the Night time, as if they had been Liquid Fire, but Palish.

25. We were full Open with the *Bay of Biscay*. Several Gulls were hovering over the Surface of the Water to Catch Fish, which swam by in vast Shoals, at above 50 Leagues distance from any Land. At other times I have seen several Birds Floating upon the Water, which being driven by some Tempest from the Coasts of *Spain* and *Portugal*, have been Tired in their Flight, and so Drown'd. This happens frequently in the *Great Ocean*, where they meet with no Land to Fly to in several Hundred Leagues: and sometimes even in the *Mediterranean*, in the Mid-Seas between the *Christian* and *Barbary-Shores*. In blowing Weather, among other Birds flying crows, we saw a Hawk making to our Ship, then under good and swift Sail, which perch'd upon the Round-Top of the *Main-Mast*; which one of the Seamen espying, he presently run up the Shrouds, and brought down the Hawk, which made no attempt to fly away, being quite spent.

27. We found our selves by our *Observations*, in the *Lat.* of 42 Deg. 17 Min. the Weather being Excessive Hot.

28. Dreadful Lightnings in the Clouds towards the Evening; after which great Dews fell; the Weather Extream Hot.

30. This Morning we were surpriz'd to see our selves within 4 or 5 Leagues of the Shore, when we thought that we had been above 20. In the Afternoon we weathered the Westernmost Isle of the *Burlings*: On the greatest of which, being as we guess'd, above half a Mile in Length, the *Portuguese* have built a Fort, to hinder the *Barbary* Pyrates from Careening their Ships there, or taking in Fresh Water. The Land of it very High. By it lie several Rocks. The other Islands are Distant about a League. I told 5 of them: the Greatest of which last lye somewhat inward to the Shore. For 2 Nights together about this time (28 and 29) the Sky being very Hazy, the Sun set in a Colour as Deep as Blood, which was very astonishing. We were then in the *Lat.* of 40 Deg.

31. Betimes in the Morning we sailed by the *Rock of Lisbon*.

Sept. 1. In the Morning we made *Cape St. Vincent*. All along the Coasts, at the Distance of about 2 or 3 Leagues, are several *Watch-Towers* built to give notice of *Pirates*.

5. In the Morning we weathered the Point of *Cadiz*, and came to an Anchor in the Bay of *Bulls*, about half a League from the great *Porgos*; and

in the Afternoon went on Shore. We were entertain'd by the *English Consul*, and carry'd by him to view the *Fortifications*, which are esteem'd to be as Regular as any in *Christendom*; built in the same place where the Town had been attack'd formerly by the *English* under the Conduct of the Earl of *Essex*, in the Reign of Queen *Elizabeth*. Plays are usually Here, as in other Parts of *Spain*, Acted on a Sunday.

9. We sail'd from *Cadiz*.

10. This Afternoon we were forc'd to Anchor, not far from Cape *Spartel* or *Sprat*, as the Seamen call it, not being able to weather the Point.

11. This Day we came to an Anchor in *Tangier-Bay*.

Tangier lies within the Entrance into the Strait of the *Mediterranean*, in the Latitude of about 35 Deg. 36 Min. It is situated in the Bottom of a Bay, and is built on the Side of a Hill, overlooking the Sea, encompassed with High Walls to the Land-ward, and commanded by a strong Castle: The Heats would be very Troublesome but for the *Sea-breezes* which cool and fan the Air. In the Castle I met with a *Roman Monument*, erected to the Honour of *P. Besius*, a great Officer and Soldier in *Trajan's* Time, who, among his other Titles, is there styl'd, PRO. FIG. MAURITANIAE TINGITANA E, [which since has been taken away, and presented to the University of *Oxon* by Sir *Hugh Cholmondly*.] The *English* have 2 Churches here, (though they only make use of one, the other being reserv'd against all Accidents) both of them very neat and convenient; though not to be compar'd with the Church of the *Portuguese*, Retain'd still, (according to the Articles of Agreement when the King of *Portugal* made over the Right and Title, and gave the Possession of *Tangier* to the Crown of *England*) by *Canons Regulars*, belonging to it, which is very Stately, and Adorn'd with Rich Images, and Supported by *Marble Pillars*. Toward one end of the *English Church*, just by the *Vestuary*, which had been formerly a *Turkish Mosch*, and afterwards the Chappel of a Convent of *Dominicans*, is a Monumental Stone-Table, with *Arabick Characters*, containing an Account of the Houses, Lands, and other Revenues, belonging to it, set up in the 743 Year of the *Hegira*, that is, of *Christ* 1341. The Mole is in good forwardness; they having gain'd above 200 Yards in the Sea, in order to the making a Good and Safe Harbour for Ships to Ride in, which lie open to Wind and Waves; the outward side to the Sea-ward somewhat Sloping. Old *Tangier* lies at some little Distance, where they find very frequently, in Digging, several pieces of *Roman Coin*.

13. We weigh'd out of *Tangier*, and turn'd into the Strait, though against the Winds. The Distance between *Gibraltar*, (which gives Name to the Straits, and is joyn'd to the Continent of *Spain* by a narrow *Isthmus*;) and *Seuta*, (a well-built and strongly Fortify'd Town, lying under the Hill *Alybe*, call'd so by the *Greeks*, which the Seamen commonly call, as do some *Spanish Writers*, *Apes-Hill*, from the great Number of *Apes* which used formerly to Haunt there, at which places *Hercules* is feign'd to have set up his Pillars) may be about 6 Leagues: though both Lands lying very High (for we saw the Clouds much below them) it does not appear

appear in the Middle of the Current, out of a Tall Ship, scarce half so Broad.

15. A great Mist all the Sea over, so that we could scarce see three Lengths of the Ship, which began to vanish in the Afternoon; and then we descry'd the Cape of *Malaga* at about 4 Leagues distance; and came to an Anchor that Night. This City lies under a High Hill, and is the Seat of a Bishop, who is at this time a Natural Son of King *Philip IV*, of the Order of *St. Dominic*. Here the Merchants told us, That it had not Rain'd for 7 Months together, except a Day or two for an Hour: And that the *Algerines*, who were then Breaking with us, had not been able to have set a Fleet to Sea, if they had not been furnish'd with *Masts* from *England*. I only make a Query, Whether *Jews* or *English Men* were the Freighters.

16. The next Morning we weigh'd from *Malaga Road*, the Weather very hot. In the Evening, the Sea being quiet, we saw a great number of *Tortoises* swimming above Water, several *Bottle-Noses*, Fish of about 3 Yards long and very thick, and *Hawks* flying over to the *Barbary Coast*. The Hills of *Granada* were seen plainly by us, though at a great Distance.

21. We pass'd by *Cape de Gata*: But the *Levant Wind* still blowing, having continu'd almost in that Point for above 2 Months, as we computed from what they told us at *Tangier*, we could make but little Progress in our Voyage.

25. Between 3 and 4 of the Clock in the Morning the *Tornado's* began to Blow, and the Wind Violent for the time, with such continu'd Flashes of *Lightning* for several Hours, as that the whole Sky seem'd to be on Fire, intermix'd with Terrible Claps of *Thunder*, after which follow'd great Showers of *Rain*.

28. We were athwart *Orlando's Gap*, within 2 Leagues of the Shore: The Wind now still; but a swelling Sea coming from the Westward; which is usual before a Wind, which drives the Water before it. On *Michaelmas's* Day we were up with the Island *Ivica* or *Ivise*, as the Mariners call it. The next Day at Noon we made the Island *Majorca*, situate over against the Kingdom of *Valentia*, and came to an Anchor in a Bay of the City. In the Afternoon the Boat was sent on Shore; but the *Vice-Roy* would not give us a *Prattick*, not bringing a Patent from *Malaga*.

Oct. 1. The Secretary was sent with the King's Pass to the *Vice-Roy* to demand *Prattick*, who presently summon'd the Officers of the *Sanità*. After long Debates and Delays they Consented, and came to the Mole to receive him, he went directly to the Governour to acquaint him, that we were ready to Salute the City with what Number of Guns he pleas'd, if he would engage upon his Honour to give us as many. He Reply'd, that he would give us 3 for 5; and wonder'd that we being but a single Ship, should make such a Demand. The Secretary told him, That we were to be Treated as an *Admiral*, having a Flag on our *Main-Top*; and that the Governour of *Malaga* had done it: To this he said, That *Majorca* was a Kingdom, and that he was the King's Representative, and that by Reason

of the Miscarriage of his Predecessor, when *Monf. de Beaufort*, the *French Admiral*, was there, he had receiv'd strict Orders from *Madrid* not to do the like. The Secretary reply'd, That we had an Ambassador on Board, and had as strict Orders, and should answer as severely for the Breach of them. His last Answer was, That we might, with our *Sails Loose*, keep before the Town, till we had furnish'd our selves with what we wanted. Upon receiving this Message, the Ambassador dispatch'd away one *Joseph Gabriel Cortez*, a *Spaniard*, but employ'd by the *English Merchants* Trading to that Island, then on Board our Ship, to acquaint him, That when we were Ready to go away, we would *Loose* our *Sails*, and not before. We Landed within the *Mole*; the Walk upon it is about 4 or 5 *Yards* Broad; at the Extremity of which is a very Large and Stately Gate which leads into the City. We went into the *Great Church*, somewhat Wider than *Westminster-Abbey*, but Darkish within: The Portal very Magnificent, Adorn'd with several *Marble Statues* in *Niches* one over another. The *High Altar* very Plain and Unadorn'd: But others extraordinary Rich and Glorious. Not far from the City are several Mills to Grind their *Olives*, *Oyl* being the great Commodity of the Island.

2. The next Morning we weigh'd, without taking any kind of Notice of the Town, Sailing all along in Sight of the Island, which presented us with a pleasant and delightful Prospect; the Valleys, lying under the Hills, Fruitful of Wine and Corn. The whole Island is judg'd to be about 60 *Leagues* in Compass, and in Length about 15. To the S. S. E. lie several little Islands, called the *Cabreras*; between which and *Majorca* we Steer'd.

3. We were athwart *Port Mahon* in *Minorca*; a Fine Level Country, having but one Hill in it.

5. We descry'd the Main-Land of *Provence*.

6. We were over against the Islands *Hieres*, and the High-Land of *Thoulon*.

9. We were over against the Westermost part of the *Alps*, which we distinctly saw at about 20 *Leagues* Distance, and appear'd far Higher than the *Hills* of *Granada*.

12. We came in the Morning to an Anchor over against the *Mole*, and not far from the *Lantern* in *Genua*. Having obtain'd *Prattick* of the *Maestri della Sanità*, after a little Demur about the *Salute*, the Senate being assembled, and some of them Protesting upon their Honours, and ready to produce their Registers, that they never *Saluted* the Ship wherein was an Ambassador of *France* or *Spain*, as not taking any notice of the Person, who did bear that Character, till they had first Intimation that the Ship was arriv'd in their Port by its *Saluting* the Town. It was agreed that the Ship should *Salute* the Town with 11 *Guns*, which they were to *Answer*, as they did, with an equal Number: And after a little Pause they *Saluted* the Ambassador with 19 more, which were *Answer'd* with as many. After this, the *Duke* and *Senate* sent the Master of the Ceremonies to wait upon the Ambassador; who going away, return'd soon after with a Present of *Calves*,
Fowl,

Fowl, Wine, Sweet-meats, &c. and acquainted his Lordship, that they had Deputed 6 of their Gentlemen to Complement him, and wait upon him, which Civility he thought fit to Refuse, desiring to be *Incognito*. But however going a-shore, he was welcom'd by the *Illustrissimi Signori*, the *Durazzo's* two Brothers, the Elder of which had been *Ambassador* for the *Republick*, in the Court of *England*, and the other at *Constantinople*, and by them carry'd to see the *Villas* out of Town. The Figure of *Genoa* is Semicircular, beginning from the *Lantern* Westward, lying under an High Hill, upon the Rising of which the several Houses, built of *Marble*, afford a very Fine Prospect, and add much to the Beauty and Glory of the Place. *Strada Nuova* perchance is the most stately Street in the whole World. The *New Church* of the *Anunciata*, built by the *Lomellini*, for Curious *Painting*, Rich *Altars*, and Exactness of *Architecture*, is incomparable. The *Steps* which lead up to it, are so Many and of so Large a Compass, being Semicircular, that they may Contain about 1000 upon them at the same Time. The *Duomo* also and the *Church* of the *Theatines* are very Stately and Curious.

14. In the Evening we set Sail from *Genoa*.

18. In the Afternoon we made the Island *Gorgonia*, about 9 Leagues from *Livorne*, a little Round Island, with a Castle on the Top.

19. In the Morning we came to Anchor in *Livorne Road*, about a Mile from the Town. The *Road* is Large and Secure, especially to the Northward. The *Ambassador* kept on Board, the Governor Refusing to Salute the Ship first, though he had formerly Saluted the *French*; Pretending, that every Convoy might carry a *Flag*; and alledging that his Master, the *Grand Duke*, was as Great and Absolute, as the *Republick* of *Genoa*, and that they had rather throw themselves upon the King of *England*, than do a thing which might prove of such an ill Consequence. Sir *John Finch*, his Majesty's *Resident*, together with Sir *Thomas Baines*, came from *Florence* to Complement the *Ambassador*, and immediately Dispatch'd away a Courier to the *Grand Duke* about the *Salute*; who referr'd the whole Affair to the Governor: and he making a Protest that he was ready to pay all the Respect which was due to the *Ambassador's* Character and Quality, upon the foremention'd Pretensions, Six Days after our Arrival, absolutely refused to Salute the Ship First.

Livorne is the great Magazine of Trade for the *Levant*, being a *Free-Port*: Merchants of all Countries Residing here, *Armenians* especially, and *Jews*, which latter enjoy great Privileges, without wearing any *Distinct Mark* in their Hats, or Habits, whereby they may be known. They are allow'd the Publick Exercise of their Religion: Their *Synagogue* Large and Handsome. The *Port* inward has a *Mole* for the *Duke's Gallies* and other small Vessels to Ride in: the Entrance of which is chain'd up every Night. Hard by is the *Statue* of *Duke Ferdinand* in *Marble*, raised upon an High *Pedestal*; under which are four *Slaves* in *Brass*, in different Postures, very Large, and above the Ordinary Proportion, but done with Exquisite and Admirable Art. Two *Castles* to Seaward well Fortify'd: the

the Town Walls very High, and the 4 Gates strongly Guarded: Below which is a Ditch of about 15, or 20 Yards over, and very Deep. No Stranger is allow'd to view the Works, nor Soldier permitted to come out of the Castles. About 4000 Slaves are there, as the Merchants told us, who are lockt up in the Bagno every Night. The Piazza, where the Merchants Meet, is Adorn'd with Marble Pillars, which sustain the Portico's: at the East End of which is the Great Church, whose Roof appears very Glorious, having several Circles richly Gilded and Painted with Curious Figures. The Broad Street is Paved between 2 and 3 Yards on each side with Free-stone.

27. In the Afternoon we weigh'd out of Livorne-Road.

29. We were forc'd back by contrary Winds.

30. We weigh'd a 2d Time.

Nov. 5. At Evening we saw the Eruptions of Fire from Stromboli, which lies to the North-West of Sicily. Sometimes it Flam'd very Bright as a Beacon, at other times there appear'd only a Glowing kind of Light, like that of an ordinary Star when the Air is Thick and Hazy. They say, that it Flames most in Rainy Weather.

6. In the Morning we were up within a League of it, and plainly perceiv'd it to Smoke. It is of a Round Figure, and as we gather'd, may be about 3 or 4 Miles in Compass. Not far from it lye scatter'd several other Islands, call'd by the Ancients *Aeolia* and *Vulcania*; among which are *Lipara*, a long flattish Island, and *Vulcannello*, which Smokes most. This Afternoon we came to an Anchor in 8 Fathom Water in the Phare of *Messina*, in the Mid-Stream between *Scylla* and *Charibdis*: A violent Current Setting against us, and the Wind not High enough, so as to be able to Stemm it. The Breadth of the Strait from *Messina* to *Rhegium* may be about a League. The Land is very High on the *Calabrian* side, where are very Steep Rocks, and great Depth of Water, above 150 Fathom, as they told us: but on the *Sicilian* side, near the *Charibdis*, Shole Water, and usually an Eddy. On the Sandy Banks stands the Phare or Watch-Tower. Several Currents meeting in this narrow Passage, cause a great Ripling; and the Waters are sometimes carry'd N. and sometimes S. The great Danger is, lest the Current drive the Ship on either Side. We have had no Lightning for 7 or 8 Nights together.

7. We Sailed by *Aetna*, now call'd *Mongibel*, where the Sea widens 10 or 11 Leagues over. Now we see plainly the Smoak briskly issuing out of the Crater, the Limbus of which was all Black. The uppermost part of the Mountain was covered with Snow, except some streaks of Ashes, as we judge, which lies as it were in a Gutter, spread here and there.

13. We were up with Cape *Modona*, the Southermost Cape of the *Morea*, and sail'd by *Coron*. The Land very High, the Hills of *Arcadia* lying Eastward from us. The Weather Excessive Hot at this time, as it is in England at Midsummer.

14. In the Evening we sail'd between the Island of *Cerigo* and the *Main-Land* of *Greece*; it being about 3 *Leagues* over to *Cape Angelo*.

15. We enter'd the *Arches*, and steer'd through the *North-Channel*, leaving *Melo* and *Antimelo* on the *Starboard Quarter*, at some *Leagues* distance.

16. Betimes in the Morning we were athwart *Negropont*, and sail'd between it and *Andros*. The *Bocca* lies S. W. and N. E.

17. We sail'd by *Chios*, or *Scio*, which is very Mountainous towards the middle. It is about 4 *Leagues* distant from *Cape Caraboroun*, or the Cape of the *Black Nose*, as the *Turkish Word* signifies, which the Seamen in their usual way of corrupting Names, call *Cape Jobbernoule*, the *Corinaum* of the Ancients, a Promontory of the famous Mountain *Mimas*, which runs along the Southern side of the Bay of *Smyrna*.

18. We got into the Bay of *Smyrna*, and came to an Anchor without the Castle, not far from *St. Jacomo's Point*, as the Seamen call it, or rather *Sangiac Point*. In the Evening we heard a great Howling of *Jacalls* upon the Hills.

20. The *Consul* with the *Nation*, accompany'd with his *Druggier-Men* and *Janizaries* in their Habit, together with several *French*, *Dutch* and *Genoese* Merchants, residing in that famous *Emporium*, came to the Village near the Castle, who there expected us, with Horses. Upon our going ashore, the *Leopard* fired 51 Guns: we made about 140 Horse; and immediately upon our setting forth, we rode for about 3 *Miles* together under the Hill to the S. W. of *Smyrna*; the Places adjoyning set thick with *Olive*, *Fig*, and *Almond-Trees*. Afterwards we clammered over some Rocky Ascents; but the Horses of the Country being sure-footed, we were in no Danger of falling. Some little way we were forced to ride on the Sea-shore, and soon after came to the *Jews Burying-place*, whose *Monuments* lie flat upon the Ground. As soon as we enter'd into the City, we found the Streets full of *Greeks*, *Armenians*, *Turks* and *Jews*, whom Curiosity had drawn together to see and observe our *Cavalcade*; the *English Ships*, which were in the Bay, Firing their Guns as we pass'd near the Shore. And after 3 *Hours* Riding, the *Ambassador* was brought to the *Consul's House*, where Lodgings were provided for him.

Dec. 8. We took our Leave of *Smyrna*, being accompany'd by the *Consul* and Merchants on Board the *London-Merchant*, Capt. *John Hill* Commander, the *Leopard* being order'd to go no further than *Smyrna*, it being feared in *England*, that if she had sail'd up to *Constantinople*, the *Turks* might have press'd her for their Service in *Candia*, which they were then Besieging.

20. We sail'd between *Scio* and *Mitylene*.

21. We pass'd by *Lemnos*, and were up with the Island *Tenedos*; a fine Champaign Country, only with one Hill toward the middle of it. The Castle to the N. E. part of the Isle; over against which lie three small Islands in straight Line. Here we came to an Anchor. We saw the Ruins of *Troas* at a Distance.

22. We

22. We entred the *Hellepont*, which may be about 2 *Leagues* and a half over. The *Castles* built upon the opposite points of Land, about 11 or 12 *Years* before, after the great Defeat given the *Turkish Armata* at the *Dardanels* by the *Venetians*; Cape *Janizary* on the *Asian* side; which, with the *Philaum*, makes a tolerable good Bay for ordinary Vessels. The *Narrowest Strait* of the *Hellepont* is at the two other *Castles*, distant about 6 *Leagues*, where it may be about $\frac{1}{2}$ of a *Mile* wide. These the *Christians* call the *Dardanelli*; at which are situate the Towns, *Sestus* and *Abydus*, famous in *Greek Poésie*. These *Castles* we *Saluted* with our Guns and Trumpets, as we did the First: but each, whether out of Pride, or out of Covetousness to save the *Grand Signior's* Powder, return'd us no more than 2 Guns. The Wind blowing very Fair, we Sail'd into the *Propontis*.

23. We pass'd by *St. Stephanos Point*, where we had a full view of the S. E. Angle of *Constantinople*, which being situated upon several Hills to a Mighty Advantage, what with the *Cypress Trees* Intermixed, and what with the *Gilded Spires* of the *Moschs*, yielded us a very Diverting and Glorious Prospect. Passing by the *Seraglio Point*, which we *Saluted* by a Discharge of several Guns, in the Mid-Stream between it and *Tophana*, we came to Anchor.

26. On *St. Stephen's* day the *Ambassador* Landed at *Gallata*, (having before been Visited by the Earl of *Winchelsea*, and the Merchants Residing there) and was received there by the *Chiaus Bashi* and the *Vaivod* of *Galata*, the *Janizaries* and *Chiaufes* attending, and was waited upon by them to his Palace. And soon after the *Kaimacam*, or Governor of *Constantinople*, sent an Officer to Compliment him upon his Arrival; the *Grand Signior* being then at *Larissa* in *Thessaly*.

Jan. 2. The *Ambassadors* Old and New, went over to *Constantinople*, that Morning being assign'd by the *Kaimacam* to give them Audience; the *Chiaus Bashi* and other Officers attending at the Water-side to receive them, Horses being brought thither for them and their Followers to mount. This *Kaimacam Jusuph*, a little Old Man, had formerly been a Page of the Chamber, and chief Falconer, and afterward *Basha* of *Silistria*. He entertain'd the *Ambassadors* and their Company with Perfumes, Coffee, and Sherbet, and distributed about 15 *Kostans*, or Vests, among them: after about an Hour's stay they took their Leave.

Being upon the Coasts of *Greece* about *Aug.* or *Sept.* 1671, in the *Lat.* of 35 d. 33 m. we found by our *Azimuth-Compass*, that we had *Westerly Variation* there 5 d. 22 m.

The *Variety* of Colours of the *Sea-Water* at several times chiefly depends upon the Wind and Weather, and the Reflection of Light upon it. Its usual and most natural Colour is a *Deep Green*, but in Cloudy and Rainy Weather, the Surface of the Water appears *Blackish*. Sometimes the Water is of a perfect *Azure-Colour*, as we have observ'd for several Weeks in the *Mediterranean*. The Sun shining bright upon the Water, sometimes the upper part of the Wave appears *Purplish*, sometimes *Reddish*; though in *Shallows* perchance it may receive this latter Tincture also from the Sands which

which lie under it. When the Wind has Freshen'd, and the Ship has been under Full Sail, I have observed the Waves, at the Head and at the Sides of the Ship, to appear with a *Pale kind of Brightness*; which I ascribe rather to the *Saline Particles* of the *Sea-Water*, which were then put into a violent Agitation, than to the *Spawn of Fish*, as some of our Company imagin'd.

Sailing toward the *West* of *Portland*, we saw several *Porpisces* Playing with their Heads above Water; which I mention only, because the Seamen look upon them as fore-runners of a Storm; the *Wind* soon after Blowing very Hard at N. by E. and afterwards arriving at *Constantinople*, the *Wind* blowing a stiff Gale at North, I observ'd, with a pleasant kind of astonishment, good part of the *Propontis*, that is from *Seraglio Point* toward the Islands, which lie against the *Bay of Nicomedia*, Eastward and South-East from us, as far as we could see, cover'd as it were with *Porpisces*, which appear'd every where in great abundance. So that I am very apt to believe that *Julius Solinus* is to be understood of *Porpisces*, and not of *Dolphins*, now properly so call'd, though that be his Word, speaking of the *Bosphorus* and *Propontis*: *Hac profunda Delphinus Plurimos habent*: and soon after, *ante omnia nihil Velocius habent Maria, sic ut plerumque transvolent Vela Navium*. And I could not hear that any *Dolphins* are caught in those Seas by the *Greeks*, whose Poverty, added to the Love which their Nation has for Fish, and the Advantage arising thence, upon the Account of their solemn *Fasts* and *Abstinences* from all *Flesh*, even to a wonderful Strictness and Scrupulosity, has made them excellent Fishermen.

2. *Constantinople*, formerly *Byzantium*, was by *Constantine the Great* call'd so after his own Name, who being mightily pleas'd with the Beautiful and Advantagious Situation of the Place, between two Seas, and defended by narrow Straits on both sides, Remov'd the Seat of the *Empire* hither, and laid the Foundation of its future Splendor and Greatness. It was also by a special *Edict*, or Law, of the same Emperor, which he caus'd to be Engraven on a *Marble Pillar*, placed near his own Statue on Horse-back, in one of the *Piazza's* of his new built City call'd *Strategium*, where the Soldiers used to muster, as in the *Campus Martius*, call'd *Second* or *New Rome*, in Emulation of *Old Rome*, which he design'd and endeavour'd this should equal in all things. Accordingly he endow'd it with the same *Privileges* and *Immunities*, and establish'd the same Number of *Magistrates* and Orders of People, and Divided the whole Extent of it into 14 *Precincts* or *Regions*, according to the Division of *Rome*. And the *Greek Writers* were as *Elegant* and *Extravagant* in their Commendations of it; but the usual Title in their Ordinary Discourses and Writings, when they had Occasion to mention it without any Flourish was, *ἡ βασιλεύουσα*, or *ἡ βασιλις*, that is, the *Imperial City*, to the same Sense with that of *Sidonius Apollinaris*,

Poly. Histor.
Cap. 12.

Historical Observations relating to Constantinople; by Dr. Tho. Smith n. 152. p. 335.

Euseb. de Vita Constanti. i.

Socrat.

In Panegy.

*Salve Sceptrorum Column, Regina Orientis
Orbis Roma tui.*

He el. 69.
Sect. 2.

The Country about it was afterwards call'd *Romania* in a Limited and Restrained Sense, (for that *Romania* was anciently the same with *Orbis Romanus*, seems clear from *Epiphanius*) and the People *Ρωμαῖοι*. But I suppose this was not done till about the Middle Times of the Empire, when it began to Decline. The *Greeks* still retain the Name: For if you ask any of the *Greeks* born upon the Continent of *Thrace*, what Country Man he is? he answers forthwith, *Ρωμαῖος*, *Romios*: for so they Pronounce it. The *Turks* in like manner call a *Greek-Christian*, *Urum Gacar*, or the *Roman Infidel*; as they will call sometimes the *Emperor of Germany*, *Urumler Padisha*, or the *Emperor of the Romans*. Hence it was that the latter *Grecian Emperors* styl'd themselves *Βασιλεῖς Ρωμαίων*, *Kings of the Romans*, that is, such as were born in *Romania*, and the other Countries, which made up the *Eastern Division* of the Empire. Tho' perchance by this Flourishing Title they pretended a Right to the Government of the *West*: Upon which vain Pretumpt on they assum'd also the Title of *Κοσμοκράτορες*, or *Emperors of the World*, as if they had been the True Successors of *Augustus*, and the *Western Emperors* Usurpers, whom they call'd, by way of Contempt and Indignation, *Ρῆγες*, *Reges*, as *Luitprandus* informs us, in the Account of his Embassy to *Nicephorus Phocas*, and afforded the People of *Italy* no other Title than that of *Longobards*, or *Lombards*. The *Present Greeks* call all the *Western Christians* *Λατῖνοι* or *Φράγγοι*, *Latines* or *Franks*; the *Turks* only make use of the latter, when they speak civilly of us, and calling *Christendom* *Phrenkistan*, in the present *Greek* *Φράγγια*. The *Turks* now as proudly call *Constantinople* *Alempeha*, or the Refuge of the World; where indeed seems to be a Medley of all or most Nations of 3 Parts of it, and of all Religions; which are allow'd to be publicly profess'd and exercis'd every where throughout the Empire, except the *Persian*. For they look upon it as a Corruption of, and Deviation from, the Rules and Doctrine of *Mahomet*, their Great False Prophet: and therefore absolutely forbid it as Repugnant to, and Destructive of the Doctrine of Life and Salvation, as they speak. And accordingly they condemn with all imaginable Fury the Professors of it, who pretend to follow *Ali*, as *Sectaries* and *Apostates*, and entertain worse Opinions of them than of *Christians*, or *Jews*, or *Infidels*. The *Persians* are not behind hand with them in their Hatred and Disrespect, Deriding them as Gross and Stupid, and looking upon them as little less than Barbarous; Interest and Zeal for their several Tenets heightning their Differences so much, that in time of War they destroy one another's *Moschs*. I remember that there was a great Discourse in *Constantinople* among the *Turks* concerning an Impudent hot-headed *Persian*, who publicly, in the *New Mosch* Built by the Mother of the present *Emperor*, asserted, That *Ali* was Equal to *Mahomet*. But it seems he very luckily made his Escape out of their Hands, at which the Priests and the more Zealous *Turks* were very much scandaliz'd.

The *Greeks* have 26 Churches within the Walls of the City, besides 6 in *Galata*, of which I have given an Account elsewhere. They have also 3 Churches at *Scutari*, 1 at *Kadikui*, or *Chalcedon*. So at *Staurofis Chingilui*,

gilkui, and several other Villages upon the *Asian Shore* of the *Bosphorus*, as at *Besiktash*, *Ortakui*, *Chorouch Chesme*, which Church is Dedicated to *St. Michael the Arch-angel*, *Jenikui* or *Neochorion*, *Therapia*, *Bujukdere*, and other Villages on the *European side*. They have also a Church at *Haskui*, where is their *Burying-place*, and another near the *Bagno*, Dedicated to *St. Parasceve*. And at *Tatoula*, about a *Mile* from *Pera*, upon a *Hill*, which from the Name of the Church is thence call'd by the *Greeks* and *Franks*, *St. Demetrius's Hill*. Next to the *Holy Virgin*, *St. Demetrius* and *St. George* have most Churches Dedicated to them.

The *Armenians* have not, if I remember aright, above 7 Churches; they being few in Number in Comparison of the *Greeks*.

The *Jews* may have in the City and Places adjacent between 20 and 30 Synagogues, this being the greatest Shelter of that Accursed and Contemptible People in the *Grand Signior's* Dominions, next to *Caire* and *Saloniki*: and I believe there may be about 20 or 30000 Families of them. They are of great Use and Service to the *Turks*, upon Account of their Brocade and Merchandize, and Industry in several Mechanical Trades. All these I look upon as Natives, or Slaves rather, each paying Money for his Head every Year. These *Jews* indeed very wisely Collect this Tax among themselves, and according to an Agreement made with the *Testerdar*, or *Treasurer*, pay a certain Sum in gross for their whole Nation residing there: By which piece of Cunning they are great Gainers, and spare the Poor among them, less able to pay, by a Contribution of the Rich to make up the Sum. The *English* and *Dutch Ambassadors* have their Chappels in their Palaces common to their Respective Nations.

The Churches and Chappels of the *Western Christians* of the *Roman Communion* in *Galatia*, are,

St. Peters, belonging to the *Dominicans*, where is the Famous Piece of *Madonna di Constantinopoli*, as the *Italians* call it, or of the *Blessed Virgin*, holding the *Holy Child Jesus* in her Arms: which they pretend to be drawn by the Hand of *St. Luke*, Celebrated by some of the latter *Ecclesiastical Writers* to have been a Famous Painter. Out of Respect to this idle Tradition, the *Credulous* and *Superstitious Latines* and *Greeks* of the *Roman Communion* shew great Veneration to it, which otherwise hath little in it of Proportion, Art, or Beauty, to derive any Reputation upon the Designer, or upon his Work.

St. Francis, belonging to the *Conventual Friars* of the Order of *St. Francis*: The Ground of this, by the wise Conduct and Intercession of Cavalier *Molino*, the *Venetian Bailo*, after the Surrendry of *Candia*, upon the Peace made by the Republick with the *Grand Signior*, was procured to be Restor'd, and an Handsome Church Re-built with the Large Contributions of Money sent out of *Christendom*.

St. Benedict, belonging to the *Jesuits*, where is a Rich Altar curiously adorn'd with several Figures in *Mosaick*. This Convent was purchas'd for them by their great Benefactor, *Henry IV. of France*.

St. Mary, belonging to the *Observantines*, or *Zoccolanti*, a Branch of the Order of *St. Francis*, so call'd from their going in *Zoccoli* or *Wooden Cloggs*.

The *Capucines* have a little *Chappel* Dedicated to *St. George*, hard by the *French Ambassador's Palace*.

St. Ann, a *Chappel* frequented by the *Perots*.

St. Paul and *St. Anthony*, were both taken away some Years since from the *Christians*, and turn'd into *Moschs*. The former of which is now known by the Name of *Arab Giamesi*, or the *Mosch* of the *Arabians*. Our Interpreters mention'd also to me the *Church* of *St. John*, which the *Turks* have seiz'd upon for their Use; *St. George*, which the *Jews* are possess of; and *St. Sebastian*, which was used to be visited chiefly on *Holy-Days*.

The North Wind blows for the most part at *Constantinople*, which must be ascrib'd to its nearness to the *Euxine Sea*, which bears that Point from it. So that for want of *Southerly Winds*, Ships have been forc'd to lie a Month or two sometimes near the Mouth of the *Hellepont*. This was taken Notice of long since by *Eunapius* in the Life of *Aedesius*, who ascribes the seldom Blowing of the *South Wind* to the Situation of the Mountains: whereas it is Check'd and Overpower'd by the Exuberance of the Vapours continually sent forth from the *Black and Great Sea*, as the *Greeks* call it, in Comparison of the *Mediterranean*.

Codini de Orig
Constantinop.

The *Hellepont* is about 40 Miles in Length, and at the Castles of *Sestos* and *Abydos* the Streight may be about 3 Quarters of an *English Mile* over, or less.

The Length of the *Propontis* is about 150 Miles; both Shores may be seen in the Middle of it. In it are,

Cyzicus, an Island near the *Asian Shore*, to which it is Joyn'd by two Bridges. It still retains its Ancient Name *Κυζικος*, and is the Seat of a Bishop, being inhabited by a considerable Number of *Greeks*.

Proconnesus, not far from the former; now, as for some Centuries past, call'd *Marmora*, from the excellent Quarries of *Marble* there found, the *Marmor Cyzenicum* also being Famous in the time of *Pliny*.

Besbycus, now call'd by the *Greeks* *καλὸν λιμὲν*, or the good Haven, not far from the Entrance into the Bay of *Montanea*, to the N. by E. The *Turks* call it *Imramle*.

There are several Islands over against the Bay of *Nicomedia*, formerly call'd *Sinus Aftacenus*, according to *Strabo*, about 6 or 7 Leagues from *Constantinople*.

Prote, so call'd because they approach first to it, coming from *Constantinople*; to the South of this *Prencipe* and *Pytis*, which I take to be the same with *Pyrgos*, that lies Inmost toward the Bay; *Chalcitis*, in Modern Greek, *Chalce* or *Chalcis*; *Oxia* and *Platy*, to the North West.

The *Seraglio* is at the Extreame Point of the North-East Angle of *Constantinople*, where formerly stood *Old Byzantium*, within which toward the Haven is a stately *Kiosk* or Summer-House, from whence the *Grand Signior* usually takes Barge, when he passes into *Asia*, or diverts himself upon the

the *Bosphorus*; at which Time the *Bostangi Bassi*, who hath the Principal Care of the Emperor's Palace, and hath the Command of the *Bosphorus*, sits at the Helm and steers.

The 7 *Towers* are the South-East Extremity.

The only *Suburbs* are to the North West, along the Haven side; for above the Hill, where the 3 *Walls* begin, lies an open Champaign Country, except that here and there, at considerable Distances, Farm-Houses are scatter'd.

The *Haven* runs in from the *West*, and so opens *East*.

At the East-End of *Galata* is *Tophana*, where they cast their Great Guns.

Pera and *Galata* have about 6 Gates to the Sea-ward. The whole Tract of Ground was anciently, before the Times of the Emperor *Valentinian*, who enclos'd and fortify'd *Galata* with *Walls* and *Towers*, styl'd *πεγία*, or *Regio Peraa*, being *πέγν τῆς πόλεως*, on the other side of the City towards the North, which is the reason of its Name, seated on Higher Hills, and whose Ascent is more steep and difficult.

Our *Modern Geographers*, such as *Mercator* and *Ortelius*, who herein follow *Ptolemy*, place *Constantinople* in the *Lat.* of 43 *Deg.* and 5 *Min.* the *Arabian* and *Persian Astronomers*, as *Abulfeda*, *Nassir Eddin*, *Ulugh Beigh*, and so the *πέρχεις κανόνες* of *Chrysococcus*, Translated out of the *Persian Tables*, place it more Northerly in 45; but by latter and better Observation it is found, that they have erred in assigning the *Lat.* of this City, as of several other Places. To salve these Differences, there is no just Ground of Pretence to say, that the *Poles* are moveable, and have chang'd their Situation since their Time, whereas it may better be Imputed to their want of due Care, or to their taking things upon Trust, from the Reports of Travellers and Seamen, not having been upon the Places themselves: which is certainly to be said for *Ptolemy*, whose Observations, as to Places more Remote from *Alexandria*, are far from being Accurate and True. The Learned Mr. *John Greaves*, took the Height of the Pole at *Constantinople* with a Brass Sextant of above 4 Feet Radius, and found it to be but 41 *Deg.* 6 *Min.* But by the Observation we made in our Court-yard at *Pera* with a very good *Quadrant*, we found it but 40 *Deg.* and 58 *m.*

vid. Vol. 1.
Cap. VII. Sect.
XXV.

There is no space between the *Propontis* and the *Walls* of the City, except just at the *Seraglio-point*, which may be 200 paces in Length; where they have Raised on a Platform a Battery for great Guns: but from the Point to the End of the *Haven* West, the Space to the Gates is Unequal; in some places about 20 paces Broad, in others 3 or 4 times as many more.

The Distance between *Constantinople* and *Chalcedon*, upon the Opposite *Bithynian* Shore, may be about 3 or 4 Miles.

In the *Walls* are Engraven the Names of several Emperors, who Reign'd about the Declension of the *Grecian Empire*, as *Theophilus*, *Michael*, *Basilus*, *Constantinus Porphyrogenitus*, by whose Care, and at whose Expence, the several Breaches, caus'd in them by Sea or by Earthquakes, were Repair'd.

Kumkapi,

Kumkapi, or the *Sand-Gate*, lies toward the *Propontis*: this the *Greeks* call in their Vulgar Language *κονδοσκάλι*, *Contoscalium*, or the *Little Scale* or *Landing-place*. Here formerly was an *Arsenal* for Gallies, and other small Vessels; it being a convenient Passage over-Sea. Over this *Gate* was anciently Engraven a Curious *Inscription*, still preserv'd in that excellent Collection Published by *Gruterus*.

Jedicula Kapi, or the *Gate* of the 7 *Towers*, so call'd from its nearness to that *Acropolis*, is that, I guess, which the *Greeks* formerly call'd *χρυσή*, or the *Golden Gate*, and by some late *Latin Writers* *Chrysea*; in *Luitprandus*, *Carea*, by a Mistake either of the Transcriber or Printer, for *Aurea*; for so certainly it must be Mended. Over this *Gate* was this *Inscription*,

*Hac loca Theodosius Decorat post fata Tyranni,
Aurea Secula gerit, qui Portum construit Auro.*

cited by *Sirmond* in his Notes upon *Sidonius*. This *Gate* is in the 12th Region, and was also call'd *αεγία*, from its Beautiful and Curious Structure.

The *Gun-Gate*, formerly call'd *Roman-Gate*, not because it leads towards the Continent of *Romania* or *Thrace*, but from *St. Romanus*, where the last *Christian Emperor* was Kill'd at the assault, which the *Turks* made to force their way into the City by it.

Near *Adrianople-Gate*, is a fair large *Mosch*, call'd *Ali-Bassa*, upon a Hill accounted the highest in the City.

The Distance between Tower and Tower in the Upper Wall to the Landward may be about 90 of my Paces; the space between that and the Second Wall about 18 Paces over.

The Palace where the *Lions*, *Leopards*, and such like wild Creatures are kept, where I saw also several *Jackals*, was formerly, as the *Greeks* told me, a *Christian Church* Dedicated to *Παράκλησις*, or the *Blessed Virgin*, where this Verse is still Legible.

Κατὰ Σουλᾶν ἐπιδραε δερμὶν ἐν μάχαι.

There is no *Tide*, or running back of the *Water* on any side of the *Bosphorus* into the *Black Sea*, as some have imagin'd, whose Mistake might possibly arise hence, that the *Wind* being at North, and Blowing Hard, the *Current* sets more violently at such times against the several Head Lands, jetting out into the Channel, which admits of several Turnings, and so the *Waters* are forc'd back to some little Distance: or else because when the *South Wind* freshens and grows Boisterous, it makes a High Rolling Sea in *Propontis* and *Bosphorus*, and being contrary to the *Current*, gives a Check to it, so that it becomes Less Sensible, and is easily Stemmed. Where it is narrowest, the Distance seems to the Eye to be scarce a *Mile* over from one Shore to another; where Broadest, not much above a *Mile* and a half, unless

less where it runs into the Deep Bays, which by reason of their Shallowness only harbour Boats.

The Channel certainly is *Natural*, and not cut by Art, as some have Idly fancy'd, not considering how the *Euxine Sea* should discharge it self otherwise of those great quantities of *Waters*, pour'd into it by the *Ister* and *Tanais*, now call'd *Don*, and the other Rivers, whereby it becomes less salt, even very sensibly to the Taste, than several Parts of the *Mediterranean*.

The *Fish*, by a strange kind of Instinct, pass in vast Shoals twice a Year, Autumn and Spring, through the *Bosphorus*, that is, out of one Sea into another; of which the *Greeks*, who Live several Months of the Year upon them, take great Numbers, and supply the Markets at easy Rates; the *Cormorants* and other Ravenous Water-fowl, which the *Turks* will not suffer to be Destroyed or otherways Molested, Preying also upon them.

The *Weather* in some Months is very inconstant, Great Heats and Colds happening the same Day upon the Change of the Wind.

The *Winters* at *Constantinople* are sometimes extraordinary severe. I have heard it related by several *Old Greeks*, as a thing most certain, that the *Bosphorus* was Frozen over in the time of *Achmed*, and that a Hare was Couried over it. It happen'd thus, that upon a *Thaw* huge Cakes of Ice came floating down the *Danube* into the *Black Sea*, and were driven by the Current into the *Bosphorus*, where, upon the Return of the Frost, they were fixed so hard, that it became passable. In the Year 1669, there was Ice in the Haven, to the great Amazement of the *Turks*; and some were so frightened at this unusual Accident, that they lookt upon it as a dismal Prodigy, and concluded that the World would be at an End that Year.

The *Aguglia*, or Obelisk in the *Hippodrome*, is betwixt 50 and 60 Foot High.

The *Historical Pillar* in *Basso Relievo*, rais'd in Honour of the Emperors *Arcadius* and *Honorius*, may be in Height about 147 Feet.

Alexius Comnenus lies Bury'd in the *Patriarchal Church* against the Wall, and his Daughter *Anna Comnena*, the Historian, who Liv'd about the Year of Christ 1117. They pretend to shew there the Reliques of St. *Anastasia*, who suffer'd Martyrdom under the Emperor *Valerianus*; and of St. *Euphemia*, Virgin and Martyr, who lost her Life most Gloriously for Christ's Holy Religion at *Chalcedon* under *Dioclesian*.

In *Sancta Sophia* there are Pillars so Great, that a Man can scarce Fathom them at Twice. At the End of the Gallery, that joyns the other Two, each about 30 of my Paces wide, there is a piece of Transparent Marble, Two or Three Inches Thick. In the North Gallery upon the Pavement is a Reddish sort of Marble Stone, brought, as the *Turks* and *Christians* relate, from *Palestine*, on which they Fable, that the Blessed Virgin used to wash the Limbs of our Saviour.

I observed but One Step from the Body of the Church to the Bema, or Place where the Altar formerly stood.

The

The great *Mosch* at *Chasim-Bassa* on *Pera Side* to the West was formerly a Church Dedicated to St. *Theodosia*.

Gianghir, a *Mosch* is call'd upon a Hill at *Fondaclee* near *Tophana*.

In *Constantinople* there are several narrow Streets of Trade, clos'd up with Sheds and Pent-houses; which I suppose were in use before the *Greeks* lost their Empire, and are the same with the *οικηταὶ καὶ πεντοὶ δεῦροι* in *Chrysoloras* his Epistle. But besides these Places, several Trades have their distinct Quarters. The Streets are rais'd for the most part on each Side, for the greater Convenience.

Not far from *Suleimania* is the House of the *Aga*, or General of the *Janizaries*, which so often changes its Masters.

Pompey's Pillar, as the *Franks* Erroneously call it, is of the *Corinthian Order* curiously wrought, about 18 Foot in Height, and 3 in Diameter.

Beshiktash, a Village within 2 or 3 Miles of *Constantinople* towards the *Bosphorus*, where lies Bury'd the Famous Pyrate *Ariadin*, whom the *Christian Writers* call *Barbarossa*, who Built here a Handsome *Mosch*, having two Rows of *Fillars* at the Entrance. The *Captain Bassa*, usually before he puts to Sea with his *Armata* or *Gallies*, visits the Tomb of this Fortunate Robber, who had made several Thousand *Christian Slaves*, and makes his Prayers at the Neighbouring Church for the good Success of his Expedition.

They Reckon in the City above 100 Publick Baths, every Street almost affording one. They are Esteem'd Works of great Piety and Charity, there being a continual Use of them, not upon the Account of Religion, but of Health and Cleanliness. For their Diet, being for the most part hot spiced Meats in Winter, and Crude Fruits in the Summer; their Liquor, Fountain Water, or Coffee; to which we may add their Lazy kind of Life; (for Walking is never used by them for Digestion, or otherwise in the way of Diversion,) frequent Bathing becomes necessary.

There are several Receptacles of Water under Ground, and one particularly under the Church of *Sancta Sophia*, as I was inform'd; but I did not think it worth my Curiosity to descend into it. These were of great use to the poor *Greeks* in the last Fatal Siege; but the *Turks* are so secure, that they do not think that they deserve either Cost or Pains to keep the Waters sweet, or the Cisterns in Repair.

The *Aqueducts*, which answer to those Glorious *Aqueducts* near *Pyrgos*, and convey the Water to the Great Cistern near *Sultan Selim's Mosch*, are in that part of *Constantinople*, which lies between the *Moschs* of *Mahomet the Great* and *Sha-zade*.

The *Turks* began to Besiege *Constantinople* on the 5th of April, and took it the 29th of May, on Whitsun-Tuesday Morning, 1453, or as the *Turks* Reckon, in the Year 857 of the *Hegira*, or Flight of *Mahomet*, the 22d Day of the First *Jomad*.

The Chappel where *Ejub Sultan* is Interred, at whose Head and Feet I observed Great Wax-Candles, is Enclos'd with Latten Wire Grates, for the better Accommodation of such Religious *Turks*, as come to pay their Respect

Respect to the Memory of this great *Mussulman Saint*. In the Middle of the *Area*, there is Raised a Building sustain'd by excellent *Marble Pillars*, ascended by two several Pair of Stairs, where the *New Emperor* is *Inaugurated*, and where he usually goes in *Biram Time*.

3. *Montanea*, formerly call'd *Nicopolis*, according to *Bellonius*, or rather *Cios*, the Bay hence call'd *Sinus Cianus*, lies in the Bottom of a Bay about 80 Miles from *Constantinople*, and is the *Scale* or *Landing-place* for *Prusa*, from which it may be about 12 Miles; in the Middle-way to which is the Village *Mouffanpoula*.

Prusa, now call'd by the *Turks* *Bursia*, the chief City of *Bithynia*, is Seated at the Foot partly, and partly upon the Rising of the Mount *Olympus*, which is one of the Highest Hills of the *Lesser Asia*. Its Top is covered with *Snow* for 9 or 10 Months of the Year, several Streams of Water flowing down the Hill continually, accounted very *Unwholesome* from the *Snow* mix'd with it. In the upper Part of the City, to the North-west, lies the *Seraglio*, which is Walled round: But the Emperors not Residing here since their Acquits in *Thrace*, or scarce making Visits to this Imperial City; and none of their Sons Living here of late, according to the Former Policy of the *Turkish* Emperors, who did not permit their Sons when Grown up to be near them, but sent them to some honourable Employment, accompany'd with a *Bassa* and *Cadi* to instruct them in the Arts of War and Government, it lies now neglected and despoiled of all its Ornaments.

An Account of Prusa in Bithynia, and the Observations in Turkey, continued by Dr. Tho. Smith. n. 155. p. 431.

In this Part also are the *Sepulchres* of *Osman*, the Founder of the Family which now Reigns, and his Son *Urchan*, who took the City, near a *Mosch*, formerly a *Christian Church* dedicated to *St. John*, and where was formerly a *Convent* of *Religious* Built by *Constantinus Iconomachus*, where I saw the Figure of a *Cross* still remaining upon the Wall. Here hangs up a *Drum* of a vast bigness, such as they carry upon the Backs of *Camels*, and I suppose is one of those which they us'd in Taking of the Place.

In the lower Part, near the Bottom of the Hill, *Morad II*, the Father of *Mahomet the Great*, lies Buried; near whereunto was formerly the *Metro-political Church* of the *Holy Apostles*. The *Bezesfen*, or *Exchange*, seems to be much Better and Larger than the Great one at *Constantinople*; as are several *Caravanferas* built for the Use and Accommodation of Merchants, and Travellers.

Without the City toward the East, is the *Mosch* and *Sepulchre* of the Emperor *Bajazid the First*, whom the *Turks* call *Jilderim*, or *Lightning*, and the *Greek Writers* $\Delta\alpha\iota\lambda\alpha\psi$. Not far from hence is the *Mosch* of *Mahomet the First*, and his *Sepulchre*. Toward the West, upon the Side of the Hill, is the *Mosch* of *Morad the First*, whom they call *Gazi*, or the *Conqueror*, near which he lies Bury'd. There are in the whole about 124 *Moschs*, several of which were formerly *Christian Churches*, and between 50 and 60 *Chanes*. The *Castles* built by *Osman*, when he Besieg'd the City, are Slighted and Unfortify'd, the one to the North, the other to the South-West.

At *Checkenge*, about a *Mile* and a *half* out of *Town*, are the *Hot-Baths*, much frequented both by *Christians* and *Turks*. They are made very convenient to *Bathe* in, and are cover'd over, that they may be used in all *Weathers*. Among others there is a Large Round *Basin*, where they usually divert themselves by *Swimming*.

What *Opinions* the *Turks* have of our *Blessed Saviour* and the *Christian Religion*, I shall briefly shew, as they lie dispers'd in several *Chapters* of their *Alcoran*, according to which they frame their *Discourse* whensoever either their *Zeal* or *Curiosity* puts them upon this *Topick*. For *Mahomet*, upon his setting up to be the *Author* of a *New Religion*, finding such a considerable *Part* of the *World* professing the *Doctrine* of *Christ*, with all the *Mysteries* of *Faith* therein contain'd, was cast upon a *Necessity* of saying something both concerning *Him* and *It*. By which it will appear, how great the *Power* of *Truth* is above *Imposture* and *Subtilty*, and that as the *Devils* in the *Possessed* Confess'd, though against their *Wills*, *Christ* to be the *Son of God*; so this *Demoniack*, in the midst of all his *Forgeries*, and *Lyes*, and *Ridiculous* and *Childish Narratives*, not being able to *Contradict* the *Universal Belief* of the *Christians* of that and the preceding *Ages*, Founded on the *History* of the *Gospel*, hath been forc'd to give *Testimony* to several *Particulars* of it.

They confess that *Christ* was Born of a *Pure Spotless Virgin*, the *Virgin Mary*, chosen by *God*, and sanctify'd above all *Women* in the *World*; and that the *Angel Gabriel* was dispatch'd out of *Heaven* to acquaint her with the *News* of it. That such a kind of *Miraculous* and *Supernatural Birth* never happen'd to any besides; and that *Christ* was Conceive'd by the *Holy Ghost*; and that he wrought mighty *Miracles*, for Instance, That he *Cleansed Lepers*, gave *Sight* to the *Blind*, restor'd *Sick Persons* to their *Health*, and *Rais'd the Dead*. That he is a *Great Prophet*, sent by *God* to *Convert Men* from the *Vanity* and *Error* of their *False Worship*, to the *Knowledge* of the *True God*, to *Preach Righteousness*, and to *Correct* and *Restore* the *Imperfection* and *Miscarriages* of *Humane Nature*; that he was of a most *Holy* and *Exemplary Life*; that he was the *True Word of God*, the *Apostle*, or *Ambassador of God*; that his *Gospel* was *Revealed* to him from *Heaven*; and that he is in *Heaven* standing nigh to the *Throne of God*. They *Blaspheme* indeed with a *Brutishness* and *Stupidity* only befitting *Turks*, the *Mysteries* of the *Holy Trinity*, and of the *Divinity* of our *Blessed Saviour*, and deny that he was *Pat to Death*, and say, that *Another*, in his *Shape*, was *Crucify'd* by the *Jews*, and that He himself was *Assum'd* into *Heaven* in his *Body* without *Dying* at all, and consequently they will not own, that he *Satisfy'd* *Divine Justice* for the *Sins* of the *World*; so great an *Affinity* is there between the *Heresy* of *Socinus* and Profess'd *Mahometanism*.

I could never yet see any *Turkish Translation* of the *Alcoran*; they Cry up the *Elegance* of the *Style*, which being *Enthusiastick* and *High flown*, by reason also of the *Tinckling* of the *Periods*, is very delightful to their *Ears*, who seem to be affected with *Rythme* mightily. Though I suppose it is upon a more *politick Account*, that they are so averse, as to the *Trans-*

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flating it into their vulgar Language, not out of Respect to the Sacredness of the Original only, whose full commanding Expressions they think cannot be *Translated* without a great Diminution to the Sense ; but to keep it in greater Veneration among the People, who might be apt to slight and disesteem it, should it become thus common amongst them. It is enough that the *Priests* and *Learned Men* explain the difficult Passages of it to the People, and write Commentaries for the Use of the more Curious and Inquisitive. The *Persians*, on the contrary, think it no Disparagement to the *Arabick*, or Profanation of the Sense, to *Translate* this Curled Book into their own Language, and Copies are frequent among them.

The *Grand Signior's Women* are usually the Choicest Beauties of the *Christian* Spoils, presented by the *Bassa's* or *Tartars*. The present *Sultana*, the Mother of the young Prince *Mustapha*, is a *Candiot* ; the *Valide*, or Emperor's Mother, a *Russian*, the Daughter of a poor Priest, who with her Relations were seiz'd upon by the *Tartars* in an Incurfion, which they made into the *Muscovites* Country. She being receiv'd into the *Seraglio*, by her beautiful Complexion and cunning Behaviour, gain'd the Heart and Affection of Sultan *Ibrahim*, (a Man wholly addic'ted to soft Pleasures, and who seldom car'd to be long absent from the Womens Apartment, but chose to spend his Time among them.) Having the good Fortune to be the Mother of the Prince *Mahomet*, the Eldest Son of his Father, who now *Reigns*, she had all the Honours that could possibly be done her, and was the beloved *Hazaki*, or chief Concubine. During this Height of Splendor and Glory, the Court removing from *Constantinople* to *Adrianople*, distant about 120 *Miles*, as she was Passing in great State attended with her Guards, thro' the Streets of the City, in a Coach much like our Carriage-Waggons, but that they are Latticed to let in the Air, (for no one must presume to stare or scarce look upon the Women, much less must they themselves suffer their Faces to be seen in this jealous Country,) she out of Curiosity looking through the Holes, saw a poor Christian Slave in a Shop, where Sugar and such like Wares were sold. Upon her Return she sent one of her *Eunuchs* to enquire for the Person, and to ask him several Questions about his Country, Relations, Friends, and the Time when, and how long he had been a Slave : His Answers were so particular and satisfactory, that she was soon convinc'd of the Truth and Certainty of her Apprehensions, when she first cast her Eyes upon him, that he was her Brother, and accordingly it proved so. Whereupon acquainting the Emperor with it, she immediately Redeem'd him from his Patron, and having made the Poor Wretch turn *Turk*, got him considerably preferr'd.

The *Bassa's* for the most part are the Sons of *Christians*, taken into the *Seraglio*, near the Emperor's Person, and so are preferr'd to considerable Governments, or else they Raise themselves by their Conduct and Valour. *Mahomet Bassa* in the Time of *Achmet*, whose eldest Daughter he Marry'd, was the first Natural *Turk* that was made *Chief Vizir*, having before been *Captain Bassa*. The *Chief Vizir Mahomet Kupriuli*, (who settled the Empire in the Minority of this Emperor, when it was ready to be shaken into

Pieces, and dissolv'd by several powerful Factions in the State, and by the Mutinies and Discontents of the *Janizaries* and *Spahi's*, who drove different Ways) was an *Albanese* by Birth, the Son of a *Greek Priest*, whom, out of the Height of his Zeal for *Mahomet*, he made turn *Turk* in his Old Age, and converted the *Christian Church* in the Village where he was born, into a *Mosch*. This Man also forbade the *Dervises* to dance in a Ring and turn Round, which before was their solemn Practice at Set Times before the People, which they would do so long, till they were Giddy by this swift Circular Motion, and fell down in a Swoon, and then oftentimes upon their Recovery from such Trances they pretended to *Revelation*. The *Church-men* are not very kind to his Memory, looking upon him as a Man of Little or No Religion; and they give out, That if he had Liv'd, he would have forbid their *Calling to Prayers* from the Spires of their *Moschs*, and *Hanging out Lamps*; both which they look upon as solemn and essential to the Exercise of Religion; but he, as the Effect of Bigottry and Superstition.

They have a mighty Honour and Esteem for *Physicians*; for though they are of Opinion, that they cannot with all their Art prolong Life, the Period and Term of it being Fatal and absolutely Determin'd by God, yet they often Consult them upon any Violent Sickness or Pain, in order to make the time allotted them in the World more Pleasant and Easy. It is extraordinary rare that a *Natural Turk* makes Physick his Profession and Study. They who Practised it among them, when I was in *Turkey*, were for the most part *Greeks* and *Jews*, who know nothing of *Chymical Medicines*, but follow the usual Methods which they learn'd in *Italy* and *Spain*, the former having Study'd in *Padua*, and the latter in *Salamanca*, where they pass'd for good *Catholicks*. And I remember I met with a certain *Jew Physician*, who had been a *Capuchin* in *Portugal*. During the tedious Siege of *Candia*, the *Vizir*, what with Melancholy, and what with the Ill Air of the Camp, finding himself much Indisposed, sent for a *Christian Physician* Signior *Massalim*, a Subject of the Republick of *Venice*, but marry'd to a *Greek Woman*, to come speedily to him, and made him a Present of about 1000 *Dollars*, in Order to fit himself for the Voyage, and bear the Expence of it. By this Worthy Gentleman's Care, he Recover'd his Health, and would not permit him to Depart, till after the Surrendry of that City, which might be about 7 Months after his Arrival there, treating him in the mean while with all imaginable Respect. During our short stay at *Bursia*, one of our *Janizaries* accidentally Discoursing with a *Turk* about us, whom they knew to be *Franks*, told him, that there was a *Physician* in the Company, who had been lately at the *Grand Signior's Court* at *Saloniki*, with the *English Ambassador*, and was now upon his Return from *Constantinople* to *Smyrna*, where he Liv'd. This presently took vent, and the *Turks* thought that they had got a Man among them, that could cure all Diseases infallibly; for several came immediately to find us out on behalf of Themselves or their Sick Friends, and one of the most considerable Men upon the Place, desir'd the *Doctor* to go to his House to

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Visit one of his Women Sick in Bed, who being permitted to feel her naked Pulse (for usually they throw a piece of fine Silk or Curle over their Womens Wrists at such times) soon discover'd by that and other Symptoms and Indications of her Distemper, that *Opening a Vein* would presently give her Ease and Recover her; which he did accordingly, for which he receiv'd an Embroider'd *Handkerchief* instead of a *Fee*, and gain'd the Reputation of having done a mighty Cure.

They have little of Ingenious or Solid *Learning* among them; their Chief Study, next to the *Alcoran*, being *Metaphysical Niceties* about the Attributes of God, or else the Maintenance of Odd speculative Notions and Tenets, deriv'd down to them from some of their fam'd Masters and holy Men, whom they pretend to follow. Their Knowledge of the *Motion* of the *Heavens*, for which the *Arabians* and other *Eastern Nations* have been so Deservedly Famous, as their *Astronomical Tables* of the *Longitude* and *Latitude* of the *Fixed Stars*, and of the *Appulse* of the *Moon* to them, fully Evince, is now very mean, and is chiefly study'd for the use of *Judiciary Astrology*. The great *Instrument* they make use of is an *Astrolabe*, with which they make very Imperfect *Observations*, having no such thing as a *Quadrant* or *Sextant*, much less a *Telescope*, or any Mechanical Engine, to direct and assist them in their *Calculation*.

Their Skill in *Geography* is as inconsiderable; I remember I heard the *Captain Bassa*, whom they style *Admiral* of the *Black* and *White Seas*, meaning the *Euxine* and *Mediterranean*, ask this silly Question, Whether *England* was out of the *Straits*? And at another time the *Caimacan* or *Governour* of *Constantinople*, hearing that *England* was an *Island*, desir'd to know how many Miles it was about, in order, we suppos'd, to make an Estimate of our King's Greatness and Strength by the Extent and Compass of it.

One of the great *Astrologers* of *Constantinople*, having heard that I had a Pair of *Globes* in my Chamber, made me a Visit on purpose to see their Contrivance; being Introduc'd by a worthy Gentleman of our own Nation. After the first Ceremonies were over, I took my *Terrestrial Globe*, and Rectify'd it to the Position of the Place, and Pointed to the several *Circles* both without and upon it, and told him in short the several Uses of them: then shew'd him how *Constantinople* bear'd from *Candia*, (at that time Besieged,) *Cair*, *Aleppo*, *Mecca*, and other chief Places of the Empire, with the other Parts of the World; at which he was mightily surprized to see the whole Earth and Sea Represented in that Figure, and in so narrow a Compass, and pleas'd himself with Turning the Globe round several times together. Afterwards I set before him the *Celestial Globe*, and Rectify'd that, and shew'd him how all the Noted *Constellations* were exactly Describ'd, and how they Mov'd Regularly upon their *Poles*, as in the *Heavens*; some Rising and others Setting, some always Above the *Horizon*, and others always Under, in an *Oblique Sphere*, and particularly what Stars would Rise that Night with us at such an Hour; the Man seem'd to be Ravished with the Curiosity of it, Turning this Globe also several times together

gether with his Finger, and taking a mighty pleasure in viewing the Motion of it; and yet this silly Animal past for a *Conjurer* among the *Turks*, and was lookt upon as one that could foretel the Events of Battles, and the Fates of Empires, and the End of the World.

They have no Genius for *Sea-Voyages*, and consequently are very Raw and Unexperient'd in the Art of *Navigation*, scarce venturing to Sail out of Sight of Land. I speak of the *Natural Turks*, who Trade either into the *Black Sea* or some part of the *Morea*, or between *Constantinople* and *Alexandria*; and not of the *Pirates of Barbary*, who are for the most part *Renegado's*, and learn their Skill in *Christendom*, which they Exercise so much to the Terror and Damage of it. A *Turkish Compass* consists but of 8 *Points*, the 4 *Cardinal* and 4 *Collateral*; they being at a mighty loss how to sail by a side Wind, when by Hauling their Sails sharp, they might lie their Course, and much more when they are in the *Wind's Eye*, not knowing how to make *Tacks* and *Boords*, but choose rather to make Haste into some Neighbouring Port, till the Wind blows Fair.

They trouble not themselves with Reading the *History* of other Nations, or of Ancient Times, much less with the Study of *Chronology*, without which *History* is very lame and imperfect; which is the Cause of those ridiculous and childish Mistakes, which pass current and uncontradicted among them. For Instance, they make *Job* one of *Solomon's Judges*, and (*Isander*) *Alexander* the Great Captain General of his Army. They number *Philip of Macedon* among the *Ancestors* of our *B. Saviour*, and believe that *Samson*, *Jonas*, and *St. George*, were his Contemporaries. In this they are more Excusable than their False Prophet *Mahomet*, who in his *Alcoran* has perverted several *Historical* Notices in the Writings of the *Old Testament*, and is guilty of vile and absurd *Pseudo-chronismes*. To Remedy this Defect, of which he was very Conscious, and the better to understand the State of *Christendom*, and the particular Kingdoms and Republicks of it, the late Great and Wise *Vizir Achmet*, made his Interpreter *Panagiotti*, a Learn'd Greek, at Leisure Hours, even at the Siege of *Candia*, as well as other times, Read several Ancient *Histories* to him, and Render them *extempore* into the *Turkish Language*, and particularly *Blaeu's Atlas*, with which he was mightily pleas'd, and made great use of, and truly gain'd the Reputation of a solid and judicious *Statesman*, as well as *Soldier*, among the *Christian* Ministers, who, in the ordinary Course of their Negotiations, apply'd themselves to him.

Though their Year be according to the Course of the Moon, and so the *Turkish Months* run round the *Civil Year* in a Circle of 33 Years, and a few odd Days, yet they Celebrate the *Neuruz*, which signifies in the *Persian* Tongue the New Year, the 21st Day of March (on which Day the *Vernal Equinox* was fix'd by the *Greeks* and other *Oriental Christians*, in the Time of the Emperor *Constantine*, who made no Provision for *perihynois ionuseion* or *Procession*, which in Process of Time the Inequality between the *Civil* and *Astronomical Year* must necessarily produce) at which Time the *Cadys* and other *Annual Magistrates* and *Farmers* of the *Customs* take Place, and Reckon to that Day *Twelve-month* again.

In their *Civil Deportment* and Behaviour one towards another, the *Left Hand* is the more Worthy and Honourable Place, except among their *Ecclesiasticks*; and the Reason they alledge is, because they *Write* from the *Right Hand*, and the *Sword* is worn on the *Left Side*, and so is more at his Disposal who walks on that Hand. The *Chief Vizir* accordingly in the *Divan* sits at the *Left Hand* of the *Muphty*, each maintaining their Right of Precedence according to this way of Decision.

In their *Moschs* they Sit without any Distinction of Degrees.

Some of the more Zealous Turks cause to be Engraven on their *Scymitars* and *Bucklers* a Sentence out of the 61 *Surat*, which is concerning *Fighting* or *Battel Array*, and contains Encouragement to *Fight in the Way and Path of God*, as the Impostor words it; for which he assures them, besides Assistance from Heaven to help them to get the Victory over their Enemies, and that *God* will *Pardon their Sins*, and bring them to *Paradise*. Thus spirited with Zeal, a Turk lays about him with Fury, when he is a Fighting, and seems Ambitious of *Dying*, to gain the Delights of *Paradise*, at least indifferent whether he *Dies* or *Lives*.

The Turks are, as to their *Temper*, serious, or rather inclining to Morosity, seldom laughing, which is accounted an *Argument* of great Vanity and Lightness. They perform the *Exercises* which they use in the way of *Diversion*, as *Shooting* and *Hunting*, with a great deal of Gravity, as if they design'd them more for Health than for Pleasure; and this too but seldom. The better and richer sort, who have nothing to do, sit all day at Home, lolling upon a *Sofa*, or *Raised Place* in their Rooms, and taking *Tobacco*, which their Slaves fill and light for them; and if they retire in the Summer or Autumn, for a *Week* or *Fortnight*, to some convenient Fountain in a Wood with their *Women*, it is chiefly to enjoy the *Refreshments* of the cool Air. In times of *Triumph* indeed for some great *Success* obtain'd against the *Christians*, when the *Shops* are open for 3 *Nights* together, and hung with *Lights*, as well as the *Spires* of the *Moschs* in curious *Figures*, they are guilty of Extravagant Mirth, Running up and down the *Streets* in Companies, and sometimes *Singing* and *Dancing* after their rude way; but this Fit being over, they soon return to their former *Melancholy*. In the *Coffee-Houses* where they use to resort to tittle, there is usually one hir'd by the *Owners* to read either an idle *Book of Tales*, which they admire as Wit, or filthy *obscene* Stories; with which they seem wonderfully affected and pleased, few of them being able to Read. These are the *Schools* which they frequent for their Information, tho' in Times of War, when things went ill with them, their Discourses would be of ill Government; and the *Grand Signior* himself and his Chief Ministers could not escape their *Censures*; which manifestly tending to Sedition, and to the heightning of their *Discontents*, by their mutual Complaints, and by this free Venting of their Grievances during the War at *Candia*, the Wise *Vizir*, seeing the evil Consequences that would follow if such Meetings and Discourses were any longer tolerated, commanded that all the publick *Coffee-Houses* should be shut up in *Constantinople*; and several other great Cities of the Empire, where the Malecontents used to

Rendez-

Rendezvouz themselves, and find Fault upon every ill Success and Miscarriage, with the Administration of Affairs.

That Custom of the Turks to Salute the Emperor, or the Vizir Bassa's, with Loud Acclamations and Wishes of Health and Long Life, when they appear first in their Houses, or any publick Place, is Derived from the Greeks, who took it from the Romans. This was done by them in a kind of singing Tone; whence Luitprandus, Bishop of Cremona, tells us, That in a certain Procession (*περίλυσις*) at which he was present, they Sang to the Emperor Nicephorus *πολλὰ ἔτη*, that is, *Many Years*, (which Codinus, who Lived just about the taking of Constantinople by the Turks, expresses by *τὸ ψάλλειν τὸ πολυχρόνιον*, or by *τὸ πολυχρόνιζεν*, and the Wish or Salute by *πολυχρόνισμα*) and at Dinner the Greeks then Present Wished with a Loud Voice to the Emperor and Bardas, *ut Deus Annos Multiplicet*, as he Translates the Greek.

The Turkish Coin in itself is pitiful and inconsiderable, which I ascribe not only to their want of Bullion, but to their little Skill in Matters relating to the Mint. Hence it comes to pass, that Zecchines and Hungars for Gold, and Spanish Dollars and Zallots for Silver, stamp'd in Christendom, pass Current among them; most of the great Payments being made in them, they not Caring, either through Ignorance or Sloth, to follow the Example of the Indian or Persian Emperors, who usually melt down the Christian Money, Imported by the Merchants into their several Countries, and give it a new Stamp. The most usual Pieces are the Sheriphi of Gold, somewhat less in Value than a Venetian Zecchine; and Aspers, Ten of which are equal to 6 Pence English; and some few Three-Asper Pieces. A Mangur is an ugly old Copper Piece, 8 of which make but one Asper; and is not I think a Turkish Coin, but rather Greek. They have no Arms upon their Coins, only Letters Embossed on both sides, containing the Emperor's Name, or some short Sentence out of the Alcoran.

The Turks look upon Earthquakes as Ominous, as the Vulgar do upon Eclipses, not understanding the Philosophy of them. During my stay in Constantinople, which was above 2 Years, there happen'd but One, which was Oct. 26. 1669. about 6 a Clock in the Morning, a stark Calm preceeding. It lasted very near a Minute, and we at Pera and Galata were as sensible of it, as those who were on the other side of the Water; but praised be God, nothing fell, and we were soon rid of the Fears in which this frightful Accident had cast us.

The Turks made direful Reflexions on it, as if some Calamity would inevitably fall upon the Empire, quickly forgetting the great Triumphs and Rejoycings which they express'd but a few Days before for the Surrendry of Candia. In the Year 1668, in August, the Earth shook more or less 47 Days together in the Lesser Asia, at Angure (*Ancyra*), and for 15 at Bachasar, as we heard from a Scotch Merchant, who Liv'd there; and particularly, that at this Latter Place, on the 2d of August, between 3 and 4 of the Clock in the Afternoon, it lasted for a quarter of an Hour; several Houses were Overthrown, and some hundreds of Chimneys Fell (it being a very populous

ious Town) and yet there were but 7 Kill'd. The Trembling being so violent, both Turks and Christians forsook their Houses, and betook themselves to the Fields, Vineyards, and Gardens, where they made their abode for several Days.

Their Punishments are very severe; this being judg'd the most Effectual Way to prevent all Publick Disorders and Mischiefs. They use no great Formality in their Processes: If the Criminal be taken in the Fact, and the Witnesses ready and present to attest it, and sometimes if there be but Probable Circumstances, without full Convictions, they Condemn him: and soon after Sentence, sometimes in an Hour or less, hurry him away to Execution. For an ordinary Crime, Hanging is the usual Death: but for Robbery and Murder, committed upon the High-way by such as Rob in Parties and Alarm whole Provinces, or for Sacrilege, or for any Heinous Crime against the Government, either Gauching, or Excoriation, or Cutting off the Legs and Arms, and leaving the Trunk of the Body in the High-Way, or Empaling, that is, Thrusting an Iron Stake through the Body out under the Neck, or at the Mouth, in which Extreme Torment the Miserable Wretch may Live 2 or 3 Days, if the Guts or Heart happen not to be Wounded by the Pointed Spike in its Passage. This Punishment seems to have been in Use among the Romans; Seneca, Epistle 14. Cogita hoc loco Carcerem, & Cruces, & Eculeos, & Uncum, & Adactum per Medium Hominem, qui per Os emergat, stipitem: and so in his Book De Consolatione ad Marciam, Cap. 20. Alii Capite conversos in terram suspendere: Alii per Obscena Stipitem egerunt, Alii Brachia Patibulo explicuerunt. Murder is seldom Pardoned, and especially if the Relations of the Murdered Person demand Justice.

The Circumcision, tho' it be a Sacred Rite, is perform'd in their Private Houses, and never in the Moschs.

The Women colour their Eye-brows and Lids with an ugly black Powder, I suppose to set off their Beauty by such a Shadow; and their Nails with the Powder of Kanna, which gives them a Tincture of faint Red, like Brick, (as they do the Tails and Hoofs of Horses) which they look upon as a great Ornament. Their great Diversion is Bathing; sometimes thrice, if not four times a Week. They do not permit them to go to Church in time of Prayer, for fear they should spoil their Devotion; the Turks being of so Brutish a Temper, that their Lust is Raised upon the Sight of a fair Object. They are call'd oftentimes by the Names of Flowers and Fruits, and sometimes Phantastick Names are given them, such as *Sucar Birpara*, or Bit of Sugar; *Dil Ferib*, or Ravisher of Hearts; and the like.

Their Skill in Agriculture is very mean. In their Gardens they have several little Trenches to convey Water where it may be most Necessary for their Plants and Flowers. They know little or nothing of Manuring their Grounds; sometimes they burn their Fields and Vineyards after Harvest and Vintage, partly to destroy the Vermine, and partly to enrich the Soil. They tread out their Corn with Oxen, drawing a square Plank-board, about a Foot and a half, or two Foot over, studded with Flints; and Winnow it upon their

Threshing Floors in the open Air, the Wind blowing away the Chaff: They Feed their Horses with Barley and Chopt Straw; for I do not remember ever to have seen any Oats among them; and they make but little Hay.

For Draught of great Weight in their Carts, they make use of Buffalo's.

Camels will endure Travel 4 Days together without Water, and will Eat Tops of Thistles, Shrubs, or any kind of Boughs. They are very sure-footed, and kneel when they are a Loading. They Live to a considerable Number of Years, some even to 60.

The chief Furniture of their Houses are Carpets, or Mats, of Grand Cairo, neatly wrought with Straw, spread upon the Ground: they having no Occasion for Chairs, Couches, Stools, or Tables, their Postures within Doors being different from ours. They have no Hangings, but their Walls are Whited and set off with Painting, only adorn'd with a kind of Porcelane; no Beds clos'd with Curtains.

They seal not with Wax but Ink, at the Bottom of the Paper; the Emperor's Name being usually written with Flourishes and in perplexed Characters: Nor have they any Coats of Arms upon their Seals, there being no such thing as Gentility among them.

Some of them, notwithstanding their Zeal for Mahomet, and the Religion by him establish'd, retain not only a Favourable and Honourable Opinion of our Blessed Saviour, but even place some kind of Confidence in the Usage of his Name, or in the Words of the Gospel, though it may seem to be wholly in the way of Superstition. Thus in their Amulets, which they call Cha'maili, being little bits of Paper of 2 or 3 Fingers breadth, roll'd up in pieces of Silk, containing several short Prayers and Sentences out of the Alcoran, with several Circles with other Figures, they usually Inscribe the Holy and Venerable Name of JESUS, or the Figure of the Cross, or the first Words of St. John's Gospel, and the like. They hang them about their Necks, or place them under their Arm-pits, or in their Bosoms near their Hearts, (being the same with what the Greeks call ιγυολπια) and especially when they go to War, as a Preservative against the Dangers of it; and indeed against any Misfortune whatsoever. Some have them sow'd within their Caps: And I heard of a Turk, that was so superstitious herein, that he always pluckt it off, and was uncover'd, when he had occasion to make Water. Some are such Bigots in their Religion, and so Furious against Christians, that not only they treat them with all imaginable Scorn and Contempt, but take it ill to be salamed or saluted by them; as if it were the Effect of Sawciness or unbecoming Familiarity. Their Malice against the Christians makes them Envy the Rich Fursthey Line their Vests with, and 'tis a trouble to these Hypocritical Zealots, to see the Franks Ride upon their fine Arabian Horses.

The Respect which they shew the Alcoran, is wonderful; they dare not open the Leaves of it with unwashen Hands, according to the Advice or Command written in Arabick upon the Cover, *Let no One touch this Book*
but

but he that is Clean. They kiss it, and bend their Heads, and touch their Eyes with it, both when they open it and shut it.

The *Janizaries*, when they attend upon *Christian Ambassadors* to their Audience, seem to appear in their Bravery, and in a Habit far from that of a Soldier, being without either *Fire-Arms*, or *Swords*, which latter are not worn but in Time of Service, or when they are upon a March, or Embod'd, wearing a Cap made of *Camel's Hair*, with a broad Flap dangling behind, a Gilt Embroider'd Wreath running round it, and an Oblong Piece of Brass rising up from the middle of their Forehead near a Foot, with a great Club in their Hand, like Inferiour Officers of the *Civil Government*. But when they are in the *Camp*, they throw off their upper Vest, and *Turbants*, which they wear at all other usual Times, as Troublesome, and put on a *Fes*, or Red Cap, which sits close to their Head, and tuck up their *Duliman*, or long Coat to their Girdle, that they may be the more Quick and Expedite in their Charge.

They affect Finery and Neatness in their Cloaths and Shashes; not so much as a Spot to be seen upon them, and in Rainy or Suspicious Weather, are very careful how they go abroad without their *Tamurlicks*, which is a kind of Coat they throw over their Heads at such times.

Their Pans and Dishes are for the most part of *Copper*, but so handsomely Tim'd over, that they look like *Silver*.

There are Thousands of *Gypsies* or *Zingaries* in *Turkey*, who Live the same idle nasty kind of Life, as they do in *Christendom*, and pretend to the same Art of *Telling Fortunes*; and are look'd upon as the Off-scouring of Mankind. It is accounted the extreamest Point of Human Misery to be a Slave to any of this sort of Cattle.

The *Haggai*, or *Pilgrims*, that have been at *Mecca* and *Medina*, forbear to drink Wine most Religiously, out of a Persuasion that one Drop would Efface all the Merits of that Troublesome and Expensive Journey: And some have been possess'd with such a mad Zeal, that they have blinded themselves after their having been bless'd with the Sight of *Mahomet's Sepulchre*.

After *Jatzib*, that is an Hour and half in the Night, throughout the whole Year, there is as great a Silence in the Streets as at Midnight: The Emperor *Achmet*, in the Year 1611, having made an Order, That no One should presume to be out of his House after that time; which is to this Day most punctually observ'd. The *Bostangi Bashi*, who has the Command of all the *Agianoglans* in the *Seraglio*, the *Tofgi Bashi*, or such Great Officers, attended with a great Train of Armed Men, walking the Rounds, and drubbing such as they find abroad at unseasonable Hours, of what Nation or Quality soever, except *Physicians*, *Surgeons*, and *Apothecaries*, whom they allow to visit the Sick.

The *Turkmans* (for so they are peculiarly call'd, as if they were the true Descendents of the *Old Turks*, or *Scythians*;) have no Fixt Residence any where, but travel with their Families and Cattle from Place to Place, carrying their Wives and Children upon Camels. They pitch their Tents usually near Rivers and Fountains, for the Convenience of Water, and according

ording as their *Necessities* require, make a Longer, or a Shorter Stay. Their whole Estate consists in their Numerous Flocks and Herds, which they sell upon occasion to supply themselves with what they want, at the Towns they pass by. Their only Concern is how to Enjoy the Benefits and Blessings of Nature, without the Troubles and Turmoyls and Disquiets of Life: being Contented and Happy in one another's Company; void of all Ambition and Envy; Courteous and Humane to Strangers, that may want their *Help* and *Assistance*, kindly entertaining them with such Provision as their *Folds* afford. The Country lies open without any *Inclosures*, and the Propriety not being vested in any one, they Travel through the Plains unmolested, and find excellent Pasturage every where. The *Turks* Till no more Ground than will serve their *Necessities*; being supply'd with Corn from *Egypt*, and from *Moldavia* and *Walachia*, by the way of the *Black-Sea*; letting vast Tracts of Ground lie waste and uncultivated: So that their Sloth herein sometimes is justly punish'd with Dearth.

They have nothing to *shew* for their *Houses* and *Possessions*, but an *Hogiet*, or piece of Paper subscrib'd by the *Cadi*, if they have acquired them by their Money, or that they were their Father's before them.

The *Dervises* generally are Melancholy; and place the greatest part of their Religion in *Abstinence* and other Severities. Some cut their Flesh, others vow not to speak for 6 or 7 Years, or all their Lives long, tho' never so much provok'd or distress'd. Their Garments are made of a coarse sort of Wool, or Goats Hair. They are ty'd up by the Vow of their Order ever from Marrying. Several of this *Sect*, in the Height of their Religious Phrenzy, have attempted upon the Lives of the *Emperors* themselves, (at whose Government they have taken Disgust) as *Mahomet* the 2d, and *Achmet*, as if such desperate Attempts were Fatal to *Bigots* in all Religions.

They pay a mighty Veneration to any *Relique* of *Mahomet*, his *Banner* is still preserv'd in the Treasury of the *Seraglio*, and is lookt upon as the great Security of the Empire. They believe that it was sent from *Heaven*, and convey'd into the Hand of *Mahomet*, by the *Angel Gabriel*, as a Pledge and Sign of Success and Victory in his Battles against the *Christians*, and all other Enemies of the *Mussulman Faith*. It was sent to *Candia* to encourage the Soldiers to endure the Fatigue of that Long and Tedious Siege, and when it was brought thence, after the Surrendry of the City, to be deposited in its usual Place, the *Vizir* gave several *Christian Slaves*, that Row'd in the Gally that was fraught with this Holy Ware, their Liberty. They pretend to have some Rags of *Mahomet's Vest*, to which they ascribe great Vertue. In Confidence of which, the Emperor *Achmet*, in the Time of a great Fire, which Rag'd at *Constantinople*, when all other Means Fail'd, Dipt part of them in Water to be Sprinkled upon the Fire, to Rebate the Fury of it.

Next to the *Mustil*, or *Cadaleskires*, are the *Molla's*; of which these four are the chiefest in Dignity; The *Molla* of *Gallata*, *Adrianople*, *Alqui*, *Prusa*; and after them are reckon'd these 8, *Stambol*, *Ephendi*, *Lar*, *Misra*

Misir or Cairo, Sham or Damascus, Diarbekir or Mesopotamia, Cutaia, Sophia, Philippi.

The *Priests* have no Habit peculiar to their Profession, whereby they are distinguish'd from others. If they are put from their *Moschs* for Miscarriage, or Neglect of doing their Duty, or if they think fit to resign and be *Priests* no longer, they may betake themselves without any Scandal to *Secular* Employments; their former Character and Quality wholly Ceasing. While they remain *Priests*, they counterfeit a more than ordinary Gravity in their Discourse and Walking: and affect to wear *Turbants* swelling out, and made up with more cross Folds; which was all the Difference I could observe by their Head Attire, which is various, though I could not find that this was constantly and strictly observed.

In *Byram Time*, which is the great Festival of the Year, at which Time every one looks cheerfully and merrily, among other Signs of mutual Respect, they besprinkle one another with sweet Water; they indulge to several sports; and some are mightily pleas'd with Swinging in the open Air, the ordinary sort of People especially, paying only a few *Aspers* for the Diversion.

The *Government* is perfectly Arbitrary and Despotical; the Will and Pleasure of the *Emperor* having the Force and Power of a Law, and often-times is above it. His bare *Command*, without any *Process*, is enough to take off the Head of any Person, (tho' never so Eminent in Dignity: tho' usually for Formality, and to silence the Murmurings of the Soldiery and People, the Sentence is confirm'd by the *Muffti*.) Sometimes *Bassa's*, who have amass'd great Treasures in their Governments, are cut off in their own Houses in the midst of their Retinue, the Messengers of Death producing the *Imperial Command*, usually sent in a Black Purse, and not a Sword drawn in their Defence. Others, if they are obnoxious to the least Umbrage or Jealousy, tho' dismiss the *Seraglio* with all possible Demonstrations of the *Grand Signior's* Favour, and with Rich Presents in order to take Possession of Places of great Command in the Empire, before they have got 2 or 3 Days Journey from *Constantinople*, have been overtaken and strangled. In the Army, Commands are given according to Merit: Courage and Conduct are sure to be Rewarded, the Way lying open to the Meanest Soldier to Raise himself to be the Chief of his Order. But other Preferments depend upon meer Chance, and upon the Fancy of the Emperor, whether the Person be fit or no, and they are as soon Lost. The least ill Success or Miscarriage, proves often-times Fatal, and a more lucky Man is put in his Place, and he succeeded by a third, if Unfortunate in a Design, tho' manag'd with never so much Prudence and Valour. They admit of no *Hereditary Honours*, and have no Respect to *Descent* or *Blood*, except the *Ottoman Family*: He only is Great and Noble, whom the *Emperor* favours, and while his Command Lasts. According to a Tradition, that passes Current amongst them, a *Bassa's Son*, by a *Sultana*, or a *Daughter*, or a *Sister* of the *Emperor*, can Rise no higher than to be a *Sangiacbei*, or Governour of some little Province, much inferior to a *Bassa*, and under his Jurisdiction.

Jurisdiction. Being born of *Slaves*, for the most Part, they do not Pride themselves in their Birth, very few among them being scarce able to give any account of their Grandfathers. They have no *Sirnames*, but are distinguish'd by their Possessions and Places of Abode; and Enjoying by Law a Liberty of having what Women they please, they have little or no Regard to Alliance or Kindred.

Their *Empire* owes the Continuance of its being, to the Severity of the *Government*, which oftentimes takes place without Regard either to Justice or Equity; and to their frequent Wars, which prevent all occasions of Mutiny and Faction among the Soldiers, which happen frequently when unemployed. So that tho' Ambition may put a Warlike *Sultan* upon Enlarging his Territories by New Conquests, yet Reason of State forces a Weak and Effeminate Prince, such as was *Ibrahim*, to make War for his own Security. Their *Politicks* are not owing to Books and Study, and the Examples of past Times; but to Experience and the plain Suggestions of *Nature* and *Common Sense*. Their *Councils* formerly were open, and their Designs known and proclaimed before-hand, as if this had been a *Bravery* becoming their *Greatness*; and that they scorn'd to steal a *Conquest*. But they have learnt since the Art of *Disimulation*, and can *Lye* and *Swear* for their Interest, and seem Excessive in their Careless to the Ministers of those Countries which they intend to invade. But their *Preparations* for *Arming* are made with so much Noise, that an ordinary Jealousy is soon awaken'd by it to oppose them, in case of an *Attaque*. They seldom or never care to have War at both the Extremes of the *Empire* at the same time; and therefore they are mighty solicitous to secure a Peace with *Christendom*, when they intend a War upon the *Persian*. And as much as is possible, they avoid Quarrelling with *Two Christian Princes* at once; being usually at League either with *Poland* or *Muscovy*, when they War upon *Hungary*, and so on the contrary; dreading nothing more, than an Union of the *Christian* Princes, Bordering upon them, which would prove so fatal to their *Empire*, and quickly put a Period to their Greatness. For hereby they would be put upon a Necessity of making a *Defensive War*, to their great Loss and Disadvantage; and at last either be forced to beg a Peace of the *Christians*, or Run the hazard of losing all by a further Prosecution of the War. This they are very sensible of; and therefore as they take all Occasions to promote *Quarrels* and *Dissentions* in *Hungary* and *Transylvania*, so they greatly rejoyce when the Princes of *Christendom* are at War one with another. This is their great time of advantage, and they know that it is their true *Interest* to pursue it, tho' they do not always, by reason of the ill Condition of their own Affairs, make use of it. During the *Civil Wars* of *Germany*, the *Bassa's* and other *Commanders* of the Army, were very Importunate with the *Grand Signior* to make a War on that side, and to enlarge his Conquests as far as *Vienna*; no Conjunction having been ever so favourable to consummate such a Design, in which *Solyman* so unhappily Miscarry'd: They promis'd him an easy Victory, assuring him that the *Animosities* of the Princes of the *Empire* were so heighten'd, that there was no room left for a *Reconciliation*; that he was but to go at the Head of an Army to take Possession,

session, and that *Austria* would surrender at the first News of his March toward it. The *Emperor* was not to be mov'd at that time by these Insinuations and plausible Discourses; being continually urg'd, he as often deny'd. One Day when they came to renew their Advice about the *German War*, he having given Order before, that several Dogs should be kept for some Days without Meat, commanded that they should be brought out being almost starv'd, and Meat thrown among them; whereupon they snarl'd and bit one another; in the midst of their Noise and Fighting, he caus'd a Bear to be let loose in the same Area; the Dogs forgetting their Meat, and leaving off their Fighting, ran all upon the Bear, ready to prey upon them singly, and at last kill'd him. This Diversion the *Emperor* gave his *Bassa's*; and left them to make the Application.

A certain *Prophecy*, of no small Authority, runs in the Minds of all the People, and has gain'd great Credit and Belief among them, That their Empire shall be Ruin'd by a Northern Nation which has White and Yellowish Hair. The *Interpretation* is as various as their Fancy. Some Fix this Character on the *Muscovites*; and the poor *Greeks* flatter themselves with Foolish Hopes, that They are to be their Deliverers, and to Rescue them from their Slavery; chiefly because they are of their Communion, and owe their Conversion to the *Christian Faith* to the Piety and Zeal of the *Grecian Bishops* formerly. Others look upon the *Svedes*, as the Persons Describ'd in the *Prophecy*, whom they are most to Fear. The Ground and Original of this Fancy, I suppose, is owing to the great Opinion which they have of the Valour and Courage of that Warlike Nation. The great Victories of the *Svedes* in *Germany* under *Gustavus Adolphus* were loudly proclaimed at *Constantinople*, as if there were no withstanding the Shock and Fury of their Arms; and their continu'd Successes confirm'd the *Turks* in their first Belief, and their Fears and their Jealousies were augmented afterwards, when *Charles Gustave*, a Prince of as Heroick a Courage and as great Abilities in the Art and Management of War as the Justly Admir'd *Gustavus*, enter'd *Poland* with his Army, and carry'd all before him; seiz'd on *Warsaw*, and drove *Casimire* out of his Kingdom; and had almost made an Entire and Absolute Conquest, only a Few Places holding out. This Alarm'd the *Grand Signior* and the *Bassa's* of the *Port*, as if the *Prophecy* were then about to be fulfill'd; who did not care for the Company of such Troublesome Neighbours, who might Push on their Victories, and Joyning with the *Cossacks* advance their Arms further, and make their Country the Seat of War, which might draw after it Fatal Consequences. To prevent which, Couriers were Dispatch'd from *Constantinople* to *Ragotski*, Prince of *Transylvania*, then in Concert with the *Svedes*, to Command him to Retire with his Army out of *Poland*, as he Valu'd the Peace and Quiet of his own Country, and the Friendship of the *Grand Signior*, whose Tributary he was, and by whose Favour he had gain'd that Principality. And the *Crim-Tartars*, the sworn Enemies of the *Poles*, who at that time lay Heavy upon them, were wrought upon by the same Motives and Reasons of State, to clap up a Peace with them: that being Freed from these Distractions,

fractions, they might Unite their Forces the better together, and make Head against the Swedes.

The *Ambassadors of Christian Princes*, when they are Admitted by the *Grand Signior* to an *Audience*, (their *Presents* being then of course made, which are look'd upon as Due, not to say as an Homage) are dismiss'd in Few Words, and Referr'd by him to his *Wakil*, or Deputy, as he usually styles the *Chief Vizir*: and a small Number of their Retinue only permitted the Honour of *Kissing his Vest*, and then Rudely enough sent away.

The *Grand Signiors* keep up the State of the *Old Asiatick Princes*: They do not Expose themselves often to the View of the People, unless when they Ride in Triumph, or upon some such Solemn Occasion; When they go to the *Moschs*, or divert themselves in the Fields, either in Riding or Hunting, they do not love to be star'd upon, or approach'd; It is highly Criminal to pry into their Sports, such an insolent Curiosity being often punish'd with Death. The Story is famous of *Morad* the 3d, who Baiting a Bear in the *Old Palace* with a Mastiff, and espying 3 Fellows upon the Tower of *Bajazid's Mosch*, who had planted themselves to see the Sport, commanded their Heads to be struck off immediately, and to be brought before him, which was done accordingly. Instances of such *Capricio's* are frequent in the *Turkish History*; this following happen'd during my Stay at *Constantinople*.

Upon the Return of *Vizir Achmet* from *Candia*, after the Surrendry of that City, and a happy End put by him to that Tedious and Bloody War, He acquainting the present Emperor, then at *Adrianople*, with the History of that Famous Siege at large, made such terrible Representations of their and the *Venetians* Mining and Countermining one another, that the Emperor was resolv'd out of Curiosity to see the Experiment made of a thing that seem'd to him almost Incredible. A Work was soon Raised and Undermined, and above 30 Murderers, and Robbers upon the High-Way, and such like Villains, were put into it, as it were to Defend it. The *Grand Signior* stood upon an Eminence at some considerable Distance, expecting the Issue of it; upon a Signal given, the Mine was sprung, and the Fort demolished, and the poor Wretches torn piece-meal, to his great Satisfaction and Amazement.

The *Moon* is the Auspicious Planet of the *Turks*: according to the Course of which they celebrate their *Festivals*. They begin their *Months* from the First Appearance of it, at which time they choose, except a Delay brings a great Prejudice and Inconvenience with it, to begin their Great Actions. The *Crescent* is the *Ensign* of the *Empire*, which they paint in their Banners, and place upon the Spires of their *Moschs*. Next to the Day of the *Appearing Moon*, they pitch upon *Friday*, to Fight upon, to Begin a Journey, and especially their Pilgrimage toward *Mecca*, or to do any thing of great Consequence, as very Lucky and Fortunate.

XL. 1. July 18. 1678. At 3 in the Morning, we set out from *Aleppo*, being 16 *English*; but with Servants and Mulettiers in all 40; and in 4 Hours and an half, Travelling South by East, we arrived at a Village call'd *Cafferabite*, being at the Edge of the *Desart*.

19. We rose at One in the Morning, and directed our Course S. S. E. over the *Desart*, for a Fountain call'd *Churraick*; but our Guide losing his way, there being no Path, 'twas near Noon before we found it. The Water is of a *Purgative Quality*. In our way we found two *Arabs* with two *Asses*, one whereof carry'd *Water* and a little *Bread*, the other they Rode on by turns; they had one Gun wherewith they shot *Gazels*, the *Bullet* being a hard Stone broken round and cased with *Lead*; they had on the *Palms* of their Hands, *Elbows*, *Knees* and *Feet*, some *Gazel-Skin* ty'd, that they might be able to creep the better on the Ground, to shoot; one of the *Asses* walking by as a *Stalking Horse*, and the *Arab* imitating the Cry of the *Gazel* till he gets within shot. These *Arabs* are call'd *Silebee*. At the *Well* came to us some *Arabs* that were making *Ashes* of the ordinary sort of Weeds call'd *Chuddraife*, *Ruggot*, and *Cutcaff*; these they Cut and Dry, and putting them into a Pit, set Fire to them, and the *Ashes* cake at the bottom. The *Ashes* they carry to *Eglib* and *Tripoli*, to make *Soap* of: But the best sort of *Ashes* are made of the *Weed Shinon*, which grows about *Tadmor*, *Soukney*, *Tibe* and *Tarecca*; it grows like *Broom* in *England*, and in shape resembles *Coral*.

20. We rose at 4 in the Morning, and Travelling 2 Hours E. S. E. we arrived at *Andrene*, where we found the *Ruins* of 2 or 3 *Churches*, and of a *Great Town* lying in a large Plain; where having taken some *Fragments* of *Greek Inscriptions*, which afforded no certain *Sense*, but yet were Evidently *Christian*, we march'd again S. by E. and in about 4 Hours time came to a pleasant *Aqueduct* call'd *Sheck-alal*; this *Aqueduct* is cut through the main *Rock*, for a great way from the *Mountains*, and where it Ends, the *Arabs* have made a *Garden*, which afforded us *Melons*, *Cucumbers*, *Purslain*, &c. In a *Grott* hard by, there dwelt an *Arab* with his *Family*; he had a *Dozen Buffalo's*, which they us'd both for their *Milk*, and to plow the *Ground*, Sowing both *Wheat* and *Barley*; hither the *Arabs* resort, when they have committed any *Robbery* about *Aleppo*, or *Hama*, and here they *Repose* and *Divide* the *Spoil*.

21. We rose at 4 in the Morning, and riding 2 Hours South, we came to a *Ruin* call'd *Briadeen*; here we found the following *Inscription* on a *Stone*, good part in the *Ground*:

ΑΝΤΙΕΡΘΗ ΑΛΙΑΤΝΔΙΟΥ ΤΟΥ ΑΜΦ ΕΤΟΥΣ
ΔΙΑ ΜΑΤΕΡΝΟΥ ΚΑ (ΙΠ) ΑΠΠΟΥ ΚΑΙ ΜΑΙΚΟΥ ΚΝΕΤΜΝ
— T ——— N

From hence going S. E. in 4 Hours more we came to a *Well* call'd *Costal* (which signifies a *Spring* in *Arab*.) Most part of our way through the *Desart* we were troubled with *Rat-holes* in great Numbers, like *Coney-boroughs*,
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A Voyage of
some English
Merchants to
Aleppo, at Tadmor;
by Mr.
Tim. Lanoy and
Mr. Aar. Gooden.
year. n. 118. p.
129.

boroughs, which by the sinking in of the Earth, very much incommoded our Horses and Mules. These *Rats* have at their Tails a Bush of *Hair*, and the *Arabs* eat them all, excepting one part. From this *Well* we arose about 4 in the Afternoon, and began to Ascend small *Hills* cover'd with Trees, which for the most part, were the small *Pistacho's* which the *Arabs* pickle with Salt; but eaten green are good to quench Thirst. We Travell'd 3 Hours up the *Hills*, where we pitch'd that Night, having no other *Water* but what we carry'd with us; and at Night we had a small Shower of *Rain*, a thing unusual in that Country at that Time of the Year.

22. We rose by 2 in the Morning, and Travelling E. S. E. we came by 11 to a *Well* call'd *G'hor*.

23. We rose by one in the Morning, and Travelling most East, we came to a large Plain, where we saw before us, on a high Mountain, a great *Castle*, call'd by the *Arabs* *Anture*. When we had travell'd 2 or 3 Hours in this Plain, we espy'd an *Arab* driving towards us on a *Camel* with his *Lance*, so fast, that he came on a round Gallop, and we suppos'd him sent as a *Spy*: being come up to us, he told us he was of *Tadmor*, and that his *Prince*, the *Emir Melkam*, had that Day made Friendship with *Hamet Shideed* another *Prince*, and that together they had had 400 Men; so he kept us Company an Hour or two, and enquir'd of our *Mulettiers* if we were not *Turks* Disguis'd, with intent to seize on *Melkam*; for we travell'd with a *Bandiero*, the Impress being a *Hanjarr* or *Turkish Dagger*, and a *half Moon*. We told him we were *Franks*, which he could hardly Believe, wondering that we travell'd thus in the *Desart*, only out of *Curiosity*. Being come near to *Tadmor*, he went a little before us, and on a sudden run full speed towards the *Ruins*, we not endeavouring to hinder him. Our Guide told us he was gone to acquaint the *Arabs* who we were, and that we ought to Suspect and Prepare for the worst; so we dismounted 20 of our Servants, each having a *Long Gun*, and *Pistols* at his Girdle, and plac'd them a-breast before us: we following at a little distance behind, on Horseback with *Carabines* and *Pistols*. In this order we proceeded, and came to a most Stately *Aqueduct* which runs under Ground in a direct Passage 5 Miles, and is cover'd with an Arch of *Bastard Marble* all the way, and a Path on both sides the *Channel* for 2 Persons to walk a-breast; the *Channel* it self being about an *English Yard* in Breadth, and $\frac{1}{2}$ of a *Yard* in Depth. At 20 *Yards* Distance all the Way are *Ventiducts* for the Air to pass, and the *Holes* are surrounded with small *Mounts* of *Earth* to keep the Sand and Dust from falling down. We march'd close by these *Mounts*, which might serve us for *Defence*, expecting every Moment that the *Arabs* would come to Assail us, having the Disadvantage of the Sun and the Wind in our Faces; wherefore we Travell'd hard to gain an *Eminence* where we might post our selves advantageously, and stop and repose a little, to consider what we had to do. The *Arabs* finding us to come on with this Order and Resolution, thought not fit to adventure on us, so we gain'd the Hill, from whence we might discern these Vast and Noble *Ruins*, having a Plain, like a *Sea* for Greatness, to the Southwards of it. Here having refresh'd our Men, we fetch'd a little

Compass

Compass and descended by the Foot of a Mountain, on which stands a great Castle, but uninhabited. Here two *Arabs* came to us with *Lances*, one being *Chiah* to *Melkam*, and we sent two to meet them; they gave the *Salam Alike*, and ours return'd the *Alica Salam*, and advancing to our Company, told us, the *Emir* had understood of our Coming, and had sent them to acquaint us that He was our Friend, and that all the Country was ours. We sent back with them our *Janizary* and a Servant to Visit the *Prince* in his Tents, which were in a Garden. In the mean time we Dismounted at a Watering-place amidst the *Ruins*, but did not unload till our *Janizary* and Servant return'd with the *Emir's Tescarr*, assuring us of a Friendship and Protection, a Writing which the *Arabs* were never known to Violate before. With them came also one that belong'd to the *Sheck* of the Town, for whom we had Letters from *Useffe Aga* the *Emeen* of *Aleppo*. He desir'd us, for greater Security, to pitch our Tents under the Town-Walls, which is in the *Ruins* of a Great Palace, the Wall yet standing very high, the Town within but small, and the Houses, excepting 2 or 3, no better than Hogstyes. So we pitch'd in a deep Sandy Ground, where we found it exceeding hot. Here we waited till 3 of the Clock without Eating any thing, expecting the *Sheck* should have presented us, according to the usual Custom of the *Turks* to their Friends, and have given some Answer to the Letters we brought him; but on the contrary we found by the Gestures of the People, that we had reason to suspect them. Hereupon 2 of our Company believing that the want of a *Present* to the *Emir* was the Cause thereof, resolv'd to adventure to give him a Visit, and taking the *Janizary* and one Servant, they carry'd him a *Present* of 2 Pieces of Red Cloth, and 4 of Green, and several other things. Being come, he welcom'd them into his Tent, and plac'd the one on his Right hand, and the other on his Left. *Melkam* was a young Man, not above 25, and well Featur'd, and a most excellent Horseman; *Hamet Shideed*, the other *Prince*, was more Elderly, as about 40 Years of Age, and was not in the Tent, but sat under a Palm-tree near it. He treated them with *Coffee*, *Camel's Flesh* and *Dates*, and enquir'd of their Journey, and the Cause of their coming: They told him, it was only Curiosity to see those *Ruins*; he said that formerly *Solomon Ibn el Doud* built a City in that place, which being Destroy'd, was built again by a strange People, and he believ'd that we understanding the Writing on the Pillars came to seek after *Treasure*, he having but 6 Moons before found a Pot of *Corra Crusses*. After this he went out of the Tent, leaving them Smoaking Tobacco, to the *Janizary* and Servant, and told them, that never till that Day any *Franks* had been at that Place, and that now we knew the way through the *Desart*, we might inform the *Turks*, to their Ruin and Destruction, so that it would be Convenient for them to destroy us all: but that we coming as Friends, he would only have 4000 Dollars as a Present, else he would hang them and the two *Franks* up, and go Fight the rest. This Message being brought them, they answer'd, they could say nothing to that Demand, not knowing our Minds; but if he would permit them to go and speak with the rest, they would re-

turn an *Answer*. Hearing this, he threatn'd present Death : but at length gave leave to our *Janizary* to carry us a *Letter* from them, wherein they shew'd the Danger they were in, and earnestly entreated us to *Redeem* them, the Price set upon them being 2000 *Dollars* ; one half in *Money*, the other half in Goods, as *Swords, Cloaths, Tents, &c.* which the *Emir* promis'd to Estimate at their worth.

Upon the *Receipt* of this *Letter*, we began to examine what *Monies* we had, *Cloaths*, and other *Trade*, and found that we could not near make up that Sum. In this Confusion came two *Arabs* to receive the Things, and immediately word was brought that the *Emir* would come and visit us : we sent him word, that if he came with more than 2 *Followers*, we would not admit him. So he came with 2 *Servants* only : and in Conclusion, we made him up in *Money* and *Goods* to the Value of 1500 *Dollars* ; he Valuing our things as we pleas'd, his Design being not so much to compleat the Sum, as to take from us all we had.

After this, about Sun-set, he Return'd us our 2 *Friends*. We kept good Watch in the Night, and the next Day we Return'd by the same way we Came, and arriv'd at *Aleppo* July 29. in the Morning.

This and other the like *Violences* us'd by this *Arab Prince*, made the *Bassa* of *Aleppo* resolve to destroy him; and not long after he cajoll'd him with the hopes of being made *King* of the *Arabs*, and to draw him near the City, he *Vested* and *Cares'd* some of his *Followers*; which having its Effect, the *Bassa* surpriz'd him in his *Tents* by Night, and soon after he was put to Death. This those people were willing to believe the Effect of their so Abusing the *English*, and might much Contribute to the Security and Good Usage they found that went the *Second Time* on this Expedition.

We had not time to view these *Ruins* by reason of this Usage, though perhaps we might with Safety. We took only One of the *Inscriptions* as we pass'd by; which was thus,

ΣΕΠΤΙΜΙΟΝ ΑΤΟΡΟΔΗΝ ΤΟΝ ΚΡΑΤΙΣΤΟΝ
ΕΠΙΤΡΟΠΟΝ ΣΕΒΑΣΤΟΤ ΔΟΥΚΗΝΑΡΙΟΝ
ΚΑΙ ΑΡ.. ΑΠΗΤΗΝ ΙΟΥΛΙΟΣ ΑΥΡΗΛΙΟΣ ΣΑΝΩΗΣ
ΨΑΚΚΙΑΝΟΤ ΤΟΤ Ψ..ΛΕΝΑΙΟΤ ΙΠΠΕΤΣ
ΡΟΥΜΑΩΝ ΤΟΝ ΦΙΛΟΝ ΚΑΙ ΠΡΟΣΤΑΤΗΝ
ΕΤΟΤΣ ΗΟΦ ΜΗΝΕΙ ΞΑΝΔΙΚΩ.

A Second Voyage to Tadmor : by ... Communicated by Mr. Tim. Lanoy and Mr. Asa. Good-year. 16. p. 138.

As far as we could Conclude from our Journeys, and the Position of the ways taken by two good *Compasses*, the Distance of *Tadmor* from *Aleppo* is about 150 *English Miles*, and the Course S. S. E. or rather somewhat more Southerly, considering the *Variation* of the *Compass*, which is above half a Point Westward.

2. We set out from *Aleppo* for *Tadmor*, on *Michaelmas day* 1691, being in all, Masters and *Servants* 30 Men, well Armed, having obtained a promise of security from *Affyne*, then *King* of the *Arabs*, and one of his own People

People for a Guide. This Day our Road pointed S. by E. and in 4 *Hours* we came to a *Fountain* call'd *Chaphir-Abiad*, leaving *Old Aleppo* about an *Hour* distant on the Right-hand. Here we made but a very short stay; but proceeded to a better *Fountain* at the Foot of a very high Hill, cover'd with loose Stones, the *Ruins* of a Village call'd *Broeder*, of which there was not one *House* remaining, and Dining here, we advanc'd in an *Hour* and a *quarter*, through a fertile open Plain, to a place call'd *Emghir*; famous for the best *Wheat* that is brought to *Aleppo*. This we made our first Stage; and mounting again in the Morning about 5 a *Clock*, in less than an *Hour*, we past by an uninhabited Village call'd *Urghee*, our Road pointing as before, thro' the Fruitful Plain, Even and Pleasant; but when we came to ascend the Hills, where I reckon'd we enter'd the *Desart*, we had a troublesome Passage over loose Great Stones, without any Appearance of a Road.

Our Guide had promis'd to Conduct us through pleasant *Groves* and *Forests*; but no such thing appear'd, unless we should bestow that Name upon Low wither'd *Shrubs* that grew in the way, only one *Tree* we saw, which was of good use to us, serving as a Land-mark; and when we were come up with it, being left at a little distance on the Right hand, we gain'd the prospect of a Remote Ridge of Hills before us, and on the top of one of them an old Castle, known by the name of *Gazar Jbn Wordan*. I soon turn'd my Eyes from it, to a little round Hill, more on the Left, by which we were to direct our Course, and about a *quarter* of an *Hour* from which stood a *Sheck's House*, call'd *Sheck Ailha*, with a Well of *Water* by it; but such that we had but little Gusto to taste, though it served our Horses. All the *Country* hereabouts is stor'd with *Gazels*, and there is a sort of barbarous People there, that have hardly any thing else to Live upon, but what of these they can kill; and Necessity has taught them to be no mean Artists in their way. That Morning we had travell'd about 5 *Hours* to reach *Sheck Ailha's*; yet finding nothing to invite our Stay there, (though there were 4 or 5 *Tombs* not ill made, according to the *Turkish Mode*) about One of the *Clock* we mounted again, bending to the South East or something more *Easterly*. In our way we had a remarkable Prospect, on the Right hand, of the *Ruins* of an Ancient City call'd *Andreen*, and sometimes *Londrine*, which we were told had been formerly inhabited by *Franks*, and that there were many *Inscriptions* there. We proceeded till Sun-set, very Weary, and almost without hope of coming to *Water* that Night, tho' at the same time near dead for thirst; and in an *Hour's* Time more our Guide brought us to the side of a *Bog*, call'd by the Name of *Zerga*, where we found *Water* enough, but it was neither palatable nor wholesome, neither did the Ground seem proper to sleep upon; yet we were forc'd to be Content, there being no removing thence that Night.

Oct. 1. We departed from *Zerga*, about 2 *Hours* before Sun-rise, and as soon as 'twas Light, had the Prospect of a very high Hill: To this we made as directly as we could look, finding nothing in our way observable, except a multitude of *Holes* made in the Sandy Earth by *Rats*, *Serpents*, and other Animals, which render'd our Riding a little Troublesome; as we had

had found it upon the same Account the Afternoon before. About 2 *Hours* short of our Stage, we were shewn 3 little round Hills, lying to the Right in a direct Line, known by the Name of *Tenage*; where we were told there was good *Water*, and it's for that reason only they deserve the Notice of those that travel through such a thirsty *Desart*. The Place to which we directed our Course, was call'd *Efree*, where we arriv'd about 11 a Clock, and found, to our Great Satisfaction, excellent *Water*. Here we could discern the *Foundations* of a spacious City, and piece of a thick Wall, built of Chalky Stone, was standing; this we judg'd to be the *Remainder* of a *Castle* situated on the side of the Hill, so as both to Defend and Command the City. On the Top of the Hill, above the *Castle*, stand the *Ruins* of a Fabrick, in appearance very Ancient, built of a very Hard Stone, yet exceedingly worn by the *Weather*. 'Tis of an Oblong Figure, Pointing near to the N. E. and S. W. with only One Door on the *Easterly* End, which was once adorn'd with extraordinary good *Carvings*, of which there are still some *Remains*; but the greatest part is either worn away, or purposefully defac'd; and those Marks of Ancient *Beauty* that remain are Obscure, and difficultly Discernible.

The Outside of the Walls is beautify'd with *Pillasters* quite round, with their *Pedestals* and *Capitals* Regular and Handsome; but the *Roof* is fallen down, and within appears nothing which looks either Great or Beautiful. The Situation, and Placing the Door, hinders one from Conjecturing it to have been a *Christian Oratory*, or *Chappel*, and therefore in probability it must have been a *Heathen Temple*, and if so, then the *Piece* of the *Castle-Wall* being of a softer *Stone*, must be much more Modern. The *Goodness* of the *Water* brings the *Arabs* (who Rove up and down the *Desart*) and the *Turkmen* frequently hither: which has occasion'd a great many *Graves* about the *Temple*, and some have had *Leisure*, and (which is more difficult to be imagin'd) *Skill* enough to scratch in the *Walls* the first *Letters* of their Names, and many more in *Arabick Characters*, which we could make nothing of, no more than of an *Arabick Inscription* which lay hard by, but appeared not Ancient.

Oct. 2. We departed from *Efree*, about an *Hour* and an *half* after *Midnight*, and in 6 *Hours* and an *half* arriv'd at *Two Wells*, the *Water* 18 Fathom and 2 Foot Deep, known by the Name of *Imp Malcha Giub*. Through the greatest part of this Stage, we had a broad beaten Road; and where that was not discernible, we guided our selves by a Ridge of *Chalky Hills*, under which the *Wells* lay. The *Water* we found exceeding Bad, and of so Noisom a Scent, that we could not endure it so much as at our Noses.

In our way hither we were shewn the true *Plant* which they Burn for *Soap-Ashes*, which has no *Leaves*, but a Soft Juicy *Stalk*, shooting into several Branches, and something resembling our *Samphire*, only 'tis more round than that. The *Ashes* likewise we saw, which were made not far from the *Wells*, which in Burning run into *Cakes*, not much unlike the *Cinders* of a *Forge*, only they are heavier, and not so full of *Pores*, nor so hard as they

they are. In the Afternoon we proceeded on our Voyage 2 Hours and an half, to a Place call'd *Almyrrha*, passing rather between, than over the Hills, tho' we had something of an Ascent too. Our Journey hitherto had been altogether *Southerly*, and but little varying to the *Eastward* of Due *South*.

Oct. 3. We mounted from *Almyrrha* between 5 and 6 in the Morning, making to the Point of a high Ridge of Mountains, through an Uneven *Desart* way: we came to the Ascent after about 4 Hours Travel, which we found not difficult; and when we were on the top, we had a pleasant Prospect of the Country. This Mountain was cover'd on both sides with great Plenty of *Turpentine-Trees*, which was an Object very pleasing, having seen very few *Greens* in our whole Journey. This Tree grows very Thick and Shady, and several of them we saw loaded with a vast abundance of a small round *Nut*, the chief use whereof is to make *Oil*; though some Eat them, and account them as great a *Regalio* as *Pistaches*. Their outward Husk is green, and more Oily than that of *Pistaches*, and within a very thin Shell a Kernel both in Colour and Relish very much resembling them: but those that Eat them, seldom take the pains to search for the Kernels, but eat Husk and Shell all together, which have no ungrateful Taste. From this Hill we had a tedious *Descent*, and coming at the foot into a narrow Gut, winding this way and that between the Mountains, our Passage seem'd very long, hot, and tiresome; our want of *Water* however obliged us to proceed, whereof we now began to be in great Necessity, especially for our Horses and Mules, who had none the Night before, nor none at all that day.

About 2 of the Clock in the Afternoon a small drizzling *Rain*, which we had about half an hour, increas'd to a very plentiful *Shower*, which put us upon producing all the Vessels we had to catch it as it fell from the Heavens, or ran down the Skirts of our Tents; our Horses at the same time greedily Drinking it from the Ground. But we might have spared our Pains, for in less than half an Hour's time, our Camp was in a manner afloat, and we were surrounded with *Water* not only sufficient for us, but for an Army of 20000 *Men*; these hollow Guts which we pass'd over without the least appearance of Moisture, were, by the Cataracts which descended from the Mountains, become Rivers; so plentifully was God pleas'd to provide for us in our greatest Streight; and which increases both the Wonder and Mercy, the next Morning all this great Quantity of *Water* was pass'd away, so that in about 2 Hours Riding we could hardly perceive that there had been any *Rain* at all. This memorable Place is known by the Name of *Al-Wisfal*.

Oct. 4. From *Al-Wisfal* we proceeded for *Tadmor*. Our way lay *Southward*, but the Gut in which we travell'd, would not permit us to keep a direct Course. However, in about an Hour's walk, we pass'd by *Antor* Mountains (our Guide call'd them *Toul Antor*) through a Gut or Rent, both sides of which so directly answer'd one to the other, they would tempt a Man to believe they were separated by Art, for an Entrance into the Country. But almost

almost as soon as we were well got within the open Space, we were oblig'd to ascend another Hill, and so our Road continu'd over Hills and Valleys interchangeably all the Way. We had hardly proceeded 4 Hours, when we came to the Brow of a Rocky Mountain, separated from that whereon stands the Castle of *Tadmor*, but by a narrow Valley; in which Hill, by the Way, appear'd some Quarries of fine Stone, which probably might afford Materials to the curious Buildings in the City; where we soon after arriv'd.

Fig. 63.

Having tir'd our selves with Roving from *Ruin to Ruin*, and Romaging among *Old Stones*; and more especially not thinking it safe to linger too long in a Place, where, should the *Mountain Arabs* (who were Enemies to *Affsyne Abbasse*, our Friend) have Intelligence of us, they might either fall upon, or endeavour to intercept us in our Return.

On *Thursday, Oct. 8.* about half an Hour after 4 in the Morning, we departed from *Tadmor*, being very well satisfy'd with what we had seen, and glad to have escap'd so dreaded a Place, without any *Trouble* or *Pretences* upon us; but else with some Regret, for having left a great many things behind, which deserv'd a more particular and curious Inspection. Our Road lay almost due *East*, or a little enclining to the *North*; and on the Left Hand, a Ridge of Hills stretch'd along for a great space, sometimes about $\frac{1}{2}$ an Hour distant from the Road, and sometimes opening wider. These Hills, we were told, were stor'd with rich Veins of divers Minerals, and afforded all that vast quantity of *Marble*, the Remains whereof we had seen at *Tadmor*: and it was from a Fountain call'd *Abulfarras*, at the Foot of one of them, they fetcht out *Water*, which we drank there; the Inhabitants contenting themselves with that which runs from the hot springs. To the Right-hand lay a most barren Plain, perfectly bare, and hardly any thing *Green* to be seen therein, except it were a few *Gourds*, which our Servants found on the side of a little Rising Ground, where there was no shew of any thing *Moss* to feed them. Our Way being plain, we had the Sight of *Tadmor*, especially the Castle, for above half our Stage, till we came to an old *Caphar* House. We made indeed a very short Day's Journey in the whole, finding a Fountain of excellent *Water* in about 5 Hours and a half's Riding; which as it was a most welcome Refreshment to us in such a thirsty Desert, so it was the only good *Water* we met with till we came to *Euphrates*, which was not till the 3d Day from this Place. At this Fountain we pitch'd, near to which is a Village, but almost wholly ruin'd and deserted. 'Twas some time before any Body would be seen, for they were afraid of us: At length 3 Men came out to our Tents, Spectacles of a miserable Poverty, occasion'd by their being frequently pillag'd by the *Mountain Arabs*, and a great Duty they pay to *Affsyne Abbasse* their King, for his Protection. Three hundred Dollars they pay him Annually, when one would think the whole Village was not able to make up the Sum of *One hundred*; yet being the Remotest Place that was under his Jurisdiction, they often suffer by the Inroads of the others. The Name of the Place is *Tarecca*, a Name it receiv'd (as we were inform'd) from a Victory obtain'd there by the *Turks* over the *Mamelukes*.

Oct. 9. From *Tarecca* we mounted early, and Travelling N. E. or near that Point, in 7 *Hours* time arriv'd at *Soukney*. The Road we found much like what we had the Day before, lying over a barren Plain: only we had Hills on both sides, and sometimes Closing within *half an Hour's* Riding one of the other. The Village has its Name from the *Hot-Waters*; (for so the Word imports) which are of the same *Nature* with those of *Tadmor*; herein they *bath* frequently, the same little dirty Hole serving both for *Men* and *Women*; only they have so much *Modesty* remaining, that they have different *Hours* for the One and the Other. To say the Truth, 'twas the only Mark of *Modesty*; in other Respects they seem'd a Confident, or rather Impudent Generation of People. Before we could pitch our Tents, they Flockt about us in Multitudes, Men, Women, and Children: and of the last, many of them as naked as ever they came into the World, not so much as a Rag about them to cover them; and so numerous they appear'd, that if we had Reason to think *Tarecca* wanted Inhabitants, we had no less to conclude *Soukney* over-stockt. At this Place usually Resides an Officer of *Affyne's*, who is their *Sub-Basha*, or Governor: He whom we found there, was called *Dor*, of a good Family among the *Arabs*, to whom we made a Present, and he Civilly returned it in Barley for our Horses. Afterwards he came under our Tents, and Invited us to an Entertainment: which, considering the Circumstances of the Place, was very splendid, though it was nothing but *Pilaw* at last, a little diversify'd by the Dressing; and, to speak truly, I judge we could not have less than a Bushel of Rice set before us. His Palace indeed was not very stately; there being Few Cottages in *England* but might vie with it. To the Room wherein we were Entertain'd, which doubtless was the best, if not the only one he had, we were forc'd to Clamber, rather than Ascend, by broken Steps made of Stone and Dirt. When we were got in, and commodiously seated after the *Turkish* Mode, it seem'd large enough for about a Dozen or 14 People: At the upper End was a little space separated from the rest by a Ridge made up of Earth, within which I suppos'd he slept. The *Walls* were mean; but the *Roof* much worse, having no other Covering but Faggots; so that certainly it could not be Proof against a *Shower of Rain*. However, it serv'd well enough for our *Afternoon's* Collation; and we had come away with a good Opinion of the Gentleman's Civility, had he not afterwards endeavour'd to make a Pretence upon us, and so would have forc'd us to pay dear for our *Rice*: He pretended to a Customary *Duty* of a *Chequeen* a Head of all *Franks* that pass that Road; though probably neither he, nor his Grandfather before him, had ever seen a *Frank* there before. But when he understood by our *Guide*, that we were not so easily to be impos'd upon; and withal, that we were *Affyne's* Friends, and in our Way to his *Tents*; and especially our Treasurer, a Person he very much Esteem'd, who therefore would be sure to acquaint him with any Exaction or Injury offer'd us, his Mouth was quickly stopt, and he grew so sensible of his Error, that he sent to excuse it, and presented our Treasurer with a *Fan* of *Black-Ostrich Feathers*; and in the Morning

came himself, and conducted us about an *Hour* on our Way. This *Village* pays to *Affyne* 1500 *Dollars* per *Annum*.

Oct. 10. Continuing our Voyage still to the N. E. or something more *Easterly*, we found it another pleasant and easy Stage to another Village call'd *Tiebe*, so call'd (as they say) from the Goodness of the *Water*, the Word signifying Good; but we found them not so over Excellent; they had the Taste, and were doubtless tinctured with the same *Mineral*, with those of *Soukney* and *Tadmor*, though not so strong. But the Village it self made a better shew than usual; and the People appear'd of some better Fashion, and more Civiliz'd, than those we had left. 'Tis pleasantly situated, and makes a good Appearance as one comes up to it; the Prospect being help'd by a well-built *Steeple*, to which is now adjoyn'd their *Mosque*; but I am apt to believe it the *Remains* of a *Christian Church*, being Built with some more Art and Beauty than you shall easily find in *Turkish* Fabricks: And there are also several *Ruins* about it, which speak it to have been a more famous Place than now it is. Into the *Mosque* we were permitted to enter, without any Disturbance. This Village lies in one of the Roads from *Aleppo* to *Bagdatt*, and pays to *Affyne* an *Annual* Tribute of 1000 *Dollars*. From hence we mounted again in the Afternoon, and proceeded about 2 *Hours* and a half farther. Having Travell'd this Day, in all about 7, or 8 *Hours*; the Place we pitch'd at was a *Fountain*, and known by the Name of *Alcome*; but neither *Town* nor *House* by it; neither was the *Water* fit to be Drunk, being of the same Nature with that of *Soukney*, and almost as *Warm*.

Oct. 11. From *Alcome* we rose about an *Hour* and a half after Mid-night, our Guide groping out the Way by the help of the Stars, which now bended more to the *North* than formerly. As soon as 'twas light enough to look about us, we found ourselves in a Wild Open *Desart*, the Ground in some Places cover'd with a sort of *Heath*, and in others quite Bare. Nor had we travell'd long after the Sun was up, before, by the help of a Rising Ground, We discover'd *Arsoffa*; but 'twas after 10 a Clock before we reach'd it; and finding no *Water* any where near, we were necessitated to proceed forward for the River *Euphrates*, which we found 4 *Hours* distant from it. *Arsoffa*, or (as the *Arabs* call it) *Arsoffa Emir*, seems to be the *Remains* of a *Monastery*, having no *Town* nor *Village* near it, and being one continu'd Pile of Building of an Oblong Figure, stretching longways *East* and *West*, and enclosing a very capacious *Area*. At a distance it makes a Glittering Shew, being built of *Gypsing Stone*, or *Rock-Ising-glass*, resembling *Alabaster*, but not so hard; several Quarries of which we pass'd by in our way to it. When the Sun shines upon it, it Reflects the Beams so Strong, that they Dazle the Eyes of the Spectators. Art, or Accuracy, in the Workmanship we found none; and but very little Carv'd Work, and that mean enough; nay the very Cement they made use of, is but little better than Dirt: So that it's no great wonder to see it in *Ruins*; though it has not the Appearance of any Great Antiquity. Round about were the little *Apartments* or *Chambers* for the *Monks*, built *Arch-wise*, only One
Story

Story above Ground; but underneath are several *Cells* or *Vaults*, larger than the *Chambers*, which perhaps might serve for their *Schools*, or *Working-Houses*. In the midst of the *Area* stand the *Ruins* of several Buildings, some of which seem to have been *Cisterns* for *Water*, and it may be the *Bathing-places*: but the most Remarkable was One, which probably was the *Abbot's* or *Bishop's House*, there having been some more Pains bestow'd upon it, than the rest: and Another, which was the *Relicks* of their *Church*. This was formerly no unhandsome Structure, being Built in the Form of our *Churches*, and Distinguish'd into 3 *Isles*, of which the Middle one is supported by 18 Turn'd *Marble Pillars*, with *Capitals* upon them, not of *Marble*, but of a sort of *Clay*, and Cast into the Shape they are in, but of a Colour exactly resembling the *Pillar* it self. That which perswades to believe them *Cast*, is a *Greek Inscription* to be seen on all of them; the *Letters* whereof are not made by *Incision* in the Stone, but seem to be stamp'd, standing out higher than the Distance between them; and on one of them, by Mistake, they are so placed, as to be Read after the *Oriental* manner, from the Right-hand to the Left. The Words are these, with the *Crucifix* before, as follows:

✠ ΕΠΙ ΕΕΡΤΙ ΕΠΙΕΚ° Τε ΕΤΝΕΝ ΜΑΡΟΝΙε Τε ΧΡΕΠΙΕΚ°

From hence our Guide led us to the *River*, by the assistance of two little Hills, which are known by the Name of *Aff-Dien*, our way lying *North* and a little bending to the *East*. The Sight of the *River* was a very pleasing Prospect: and to our great Comfort we found the *Water* very clear, happening to be there before the *Rains*, and after the *Snow-waters* (which swell and disturb it in the Summer time) were all past. We pitch'd upon a *Reach* of the *River*, where it was not very broad, not being above half a *Musquet-shot* over.

Oct. 12. This Morning about Sun-rise, we proceeded on our Voyage, keeping along the Banks of the *River*, which for the most part led us *West* and *North West*: and here we had pleasant Travelling, having the *River* on the Right-hand, and Hills of *Marble* or other fine Stone, on the Left; and delightful Groves of *Tamarisk*, *Mulberry*, and other Trees, to pass through. Here every thing about us lookt Fresh and Verdant, and we met frequently Men and Women, passing on their Occasions, a thing to which (in our former Stages) we had not been accusom'd. We had also a pleasing Prospect of the Opposite Shore, and could see a great way into *Mesopotamia*: but we could meet with no Convenience to cross the *River*. There are no Places of Note remaining upon the *River*, either on one side or the other, only on the farther side we saw an Old *Castle* call'd *Giabar*, which made a good Shew; being situated on the Top of a Hill, and both for that and the way of Building, very much resembling that of *Aleppo*; only that is the Larger, and in the midst of a City; this Less, and has neither Town nor Houses about it. On our side we pass'd by a *Sheck's House*, call'd *Abul-Rarra*, and the *Ruins* of a Town a little farther, where there was a *Square Tower*

Tower built of very Ordinary Brick, but pretty Entire. After we had left these *Ruins*, we Rested to Bait, under the Shadow of a Rock, wherein were many *Apartments* and Conveniencies cut to Lodge in, which I suppose are made use of in the Winter by the People, who, during the Summer, pitch among the Trees by the *River* side. In the Afternoon we continu'd our Journey as before, keeping always at a little Distance from the *River*, till a little before Sun-set, having Travell'd 7 or 8 *Hours* the whole Day.

Oct. 13. This Day we had the same Satisfaction as the Day before, proceeding as near the *River* as the Road would permit: and having made a Stage of about 6 *Hours*, we rested under the Shade of the *Tamarisk* Trees by the *River-side*. In our Way we saw the *Ruins* of a City call'd *Baulus*, where the *Turks* had formerly a *Sangiac*: but now there is never an Inhabitant in the Place, nor House standing, but the *Ruins* of Houses, and an *Octagonal Tower* of a considerable Height, viz. 107 Steps, and Beautify'd on the out-side with *Flourishes* and an *Arabick Inscription* round about. It's a Handsome Structure, and probably the Work of the *Mamlukes*, since whose time little has been done to Adorn, but abundance to Destroy and Waste this Country. After Dinner we mounted sooner than ordinary, because hoping to reach the *Tents* of *Affyne*, we were unwilling it should be Late when we arriv'd: yet we made it near Sun-set before we got to *Fay*, a *Fountain* by which he lay. We had Travell'd still on the same Point *N.W.* with the Prospect of the *River*, the greater part of the Way, the nearest *Reach* thereof not being above an *Hour's* Riding from the *Fountain*. On the Road we met with several *Bandera's* of the *Emir's* Soldiers, who knowing our Guide, and understanding we were going to him, gave us a very Courteous *Salam*, who else, perhaps, might have Treated us with another sort of Civility. The *King's Tents* spread over a Large Plain, and took up so Vast a Space, that though we had the advantage of a Rising Ground, we could not see the uttermost Extent of them. His own particular *Tent* was pretty near the Middle of the rest, which were pitcht about it, not in a Circular manner, but stretching out in Length as the Plain open'd, or for the better Conveniency of a *Current* of *Water* which from the *Fountain* ran through the midst of them. 'Twas not at all Distinguishable from the rest but by its Bigness, and a little more Company about it; being all made of a sort of *Hair-cloth*. It cannot well be doubted but they are Descended from the Old *Arabes Scenite*, they Living just after the same manner, having no settled Abode, but remove from *Fountain* to *Fountain*, as they find Grass for their Sheep and Camels, and Water for them and themselves. They Love to Derive themselves from *Ismael*, the Son of *Abraham*.

As soon as we Alighted, we were attended by the Officers of the *Emir*, and conducted to a very Noble *Tent* built after the *Turkish Mode*, and pitcht next to his own. Hither he sent to bid us Welcome, and to enquire how we had Past in our Voyage; and presently after we had a Repast of several Dishes of Meat set before us, to stay our Appetites till a more plentiful

tiful Supper could be got ready. But before Supper the *King* himself made us a Visit in Person, bidding us Welcome to *Fay*, and asking what we had seen in our Travels that pleased? how we liked *Tadmor*? and whether we had found a *Treasure* there? For this Notion sticks in the Heads of these People, That the *Franks* go to see Old *Ruins*, only because they there meet with *Inscriptions* which direct them to some *hid Treasures*. And therefore it's no unusual thing with them, when they find a *Stone* with an *Inscription* on one side, to Turn that Down to the Ground, that it might not be Seen or Read of any. But we assur'd him we went with no such Expectations, but only out of a Desire to see the Place: neither had we brought any thing away with us but a piece of *Porphyry Stone*, which, upon his Request, we shew'd him. We let him see too a kind of rude Draught which we had taken of the Place; which he seem'd to like. He made his Visit the shorter, that he might not Incommode us after our Journey: but desir'd us we would Live after our own Pleasure and to our Satisfaction, and Command freely whatever the Camp would afford; ordering some of his People constantly to Attend upon us. When there was mention made of our Design to be gone the next Morning, he answer'd, it must not be; himself was Invited, the next Day, to a great Entertainment, by one of his *Grandeets*, and we should accompany him: but the Day following he would go out with us, and hunt part of our way towards *Aleppo*. When Supper was brought in, there was Victuals enough for 3 times our Number; A large Dish of *Pilaw* in the Middle, and 12 or 15 Dishes of several sorts of Meat about it, all Dress'd after their Manner, but exceeding good. After we had Eat and Drunk what we pleased, we rose up, and our Servants sat down in our Places; it being the Custom of the *Arabs*, and *Turks* too, from the Highest to the Meanest, all to Eat at the same Table. The best Sort sit down First, and so in Order till all are Satisfy'd, and then what remains is carry'd away. We might, if we had pleased, have Lodged under the same Tent where we Eat; but having Tents of our own Pitcht, some of our Company chose rather to Retire thither, to avoid being Disturb'd by too many Visitants.

Oct. 14. The next Morning, about 10 a Clock, we were told that the *King* was gone to the Entertainment, and expected we should follow him; and that 2 young *Camels* were Kill'd, to furnish this Sumptuous Feast; which is the Highest piece of Magnificence and Greatness to which these People, whose Greatest Riches consist in *Camels*, can arrive. The Tent was about a *Furlong* from ours; so mounting our *Horses*, we rode to it, and found it surrounded with a numerous Train of Guests; 300 at least, of different Sort and Quality. It was very Large of it self; and to be still more Capacious, 'twas left open toward the *West*. The *King* was Seated at the *North-end*, about the Midst of the Tent, upon a place Rais'd with *Cushions* and *Quilts* and *Carpets* before him: neither did he Sit *Cross-Legg'd*, as all the rest of the Company were oblig'd to do, but in a Leaning Posture. They seem'd to observe an exact Order in their Places; and when any Person of Note enter'd, those that were near his Place, rose up, and stood till he had Seated

Seated himself. But the far greatest Part could not come within the Compass of the Ring, but stood behind the Backs of the rest, leaving a spacious *Area* vacant in the middle. When we enter'd, they made Room for us on the *King's Left Hand*, which here is esteem'd the more honourable; where we sat down in the same Posture with those about us, *Cross-Legg'd*, upon a thin *Carpet*. Before Mid-day, a *Carpet* being spread in the Middle of the Tent, our Dinner was brought in, being serv'd up in large Wooden Bowls between Two Men: And truly, to my Apprehension, Load enough for them. Of these great Platters there were about 50 or 60 in Number, perhaps more, with a great many little ones, I mean, such as One Man was able to bring in, strew'd here and there among them, and placed for a Border or Garnish round about the Table. In the Middle of all was one of a larger Size than all the rest, in which were the *Camels Bones* and a thin *Broth* in which they were Boil'd: The other Greater ones seem'd all fill'd with one and the same Sort of Provision; a kind of *Plumb-Broth*, made of *Rice*, and the Fleshy Part of the *Camel*, with *Currants* and *Spices*, being of somewhat a darker Colour than what is made in our Country. The lesser were, for the most part, charged with *Rice*, dress'd after several Modes, some of them having *Leben* (a Thick Sour Milk) pour'd upon them. *Leben* is a Thing in mighty Esteem in these hot Countries, being very useful to quench *Thirst*: And truly we had need of it here; for I did not see a Drop of any sort of *Liquor*, excepting a Dish of *Coffee* before Dinner, drunk at this splendid Feast. *Knives, Forks, Spoons, Trenchers, &c.* are silly impertinent Things in the Esteem of the *Arabs*: However, we being known to make use of such Things, had large wooden Spoons laid before us. When the Table was thus plentifully furnish'd, the *King* arising from his Seat, went and sat down to that Dish that was directly before him; and so did the rest, as many as it would contain; which could not be much short of 100; and so without any further Ceremony, they fell too, thrusting their Hands into the Dishes; and Eating by Handfuls. Neither was there any occasion of *Carving*; only because those Dishes in the Middle were too remote to be reach'd, there was an Officer on purpose, who stepping in among them, and standing in Places designedly left for that End, with a long Ladle in both his Hands, help'd any one according to their Desires. When the *King* had eaten what he thought fit, he Rose up and Wash'd, and retir'd back to his former Seat; and we also did the like; others being ready to fill our places. Nor did we continue much longer under the *Tent* in that numerous Crowd; for *Assyne* perceiving us a little uneasy, and supposing we had now sufficiently satisfy'd our Curiosity, though perhaps not our Appetites, told us, we might take our Liberty, and, if we thought fit, retire to our Tents. This Favour we gladly accepted, and without Ceremony return'd, several of his Attendants waiting upon us back. Here we had another Dinner set before us, and having some of our own *Wine* and *Water* to drink with it, it went down better with us than the famous *Camel* Feast. In the Evening, the *King* mounted to see the Flight of a New *Hawk*, and stay'd abroad very late, his *Hawk* Fly-

ing away : but she was afterwards taken up by his *Falconer* ; otherwise he had not been in a good Humour all that Night, being a Man that delights very much in Sport. After his Return from *Hawking*, we went to wait upon him at his own Tent, to return him Thanks for his most Courteous and Royal Reception of us, and to desire leave to depart the next Morning. Here we found him surrounded with the chiefest of his People ; and being placed again on his *Left-Hand*, he entertain'd us with a great deal of pleasant *Discourse* ; and ask'd such *Questions* as shew'd him to be a Man of extraordinary Capacity and Judgment. As for Learning, they have no such thing among them, and therefore it's not to be expected that he should be a Scholar : but were he not a Person of more than common Prudence and Understanding, he could never have manag'd that Wild and Unruly People as he has done, ever since his Advancement to the Throne ; which must therefore have been the more difficult, because as he came to it by the *Deposition* of his *Father*, (though not Immediately) who now Lives with him as a Private Man, so has he never wanted Competitors. To his *Father* he pays a great deal of outward Respect, but is forc'd to keep a very watchful Eye over him. After about an Hour's Discourse, we were dismiss'd.

Oct. 15. In the Morning, *Affyne* not being at leisure to go a Hunting, we proceeded on our Voyage Homewards, with a great deal of Alacrity ; and in about 3 *Hours* and an *half* arriv'd at *Seray* : And hence, after a short Repast, we continu'd our Journey to *Sherby Fountain* ; which took us up about the like Space of Time. Here we accounted our selves as good as at Home, being at a Place with which we were well acquainted, and to which several times in the Year some or other of our Nation usually Resort, either for *Gazel* or *Hog-hunting*, according to their Season : nor had we hence above 7 or 8 *Hours* to *Aleppo*.

Oct. 16. Getting up pretty early in the Morning, we resolv'd to Hunt the greatest part of our way home, as we did ; and Dining at the Famous *Round-Hill*, whereon has been spent by the *English*, more Money than would purchase a Noble Estate round about it, in the Afternoon we arriv'd at *Aleppo*.

3. We departed from *Aleppo* on *Michaelmas-day* 1691, and in 6 easy Days Travel over a *Desart* Country, came to *Tadmor*. As we rode into the *Town* we took notice of a *Castle* about half an *Hour's* distance from it, and so situated as to command both the *Païs* into the *Hills*, by which we Entred, and the *City* too. But we could easily perceive it was no *Old Building*, retaining no Foot-steps of the Exquisite *Workmanship* and *Ingenuity* of the *Ancients*. Upon Enquiry we were inform'd, that it was Built by *Man-Ogle*, a Prince of the *Druces*, in the Reign of *Amurath the Third*, A. D. 1585. But I know not how to give much Credit to this Story, because I find not that either *Man-Ogle*, or any *Drucean* Prince, was ever Powerful in these parts, their Strength lying on Mount *Libanus*, and along the Coast of *Sydon*, *Berytus*, &c. 'Tis a Work of more Labour than Art, and the very Situation alone is enough to render it almost *Impregnable* ; standing on the Top of a very

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very High Hill, enclosed with a deep *Ditch*, cut out of the very Rock, over which there was only one Sole Passage by a *Draw-bridge*: This *Bridge* too is now broken down; so that there is no entrance remaining, unless you will beat the Pains to clamber up the Rock, which is in one place feasible, but withal so Difficult and Hazardous, that a small slip may endanger one's Life. Nor is there any thing within to be seen sufficient to recompense your Trouble of getting up to it, the Building being Confused, and the *Rooms* very Ill Contrived. Upon the Top of the *Hill* there is a *Well* of a prodigious Depth, as certainly it must be a great way to come at *Water* from the Top of such a Rock, the *Ditch* that surrounds it, not having the least appearance of Moisture therein; which made it therefore seem more strange that a *Wild Boar* should rush out thence amongst our Horses, when we rode up to take a more particular View of the Place.

This *Castle* stands on the *North* side of the Town, and from hence you have the best Prospect of the Country all about. You see *Tadmor* under you inclosed on 3 sides with long Ridges of Mountains: which open towards the *East* gradually to the distance of about an *Hour's* Riding: but to the *South* stretches a vast Plain beyond the reach of the Eye. In this Plain you see a large Valley of *Salt*, affording great Quantities thereof, and lying near about an *hour's* Distance from the City. And this more probably is the *Valley of Salt*, mentioned 2 *Sam.* 8. 13. where *David* smote the *Syrians*, and slew 18000 Men, than another which lyes but 4 *hours* from *Aleppo*, and has sometimes pass'd for it. The *Air* is Good, but the *Soil* exceeding Barren, nothing *Green* to be seen therein, save some few *Palm-Trees* in the *Gardens*, and here and there about the Town. And from these *Trees* I conceive it obtained its Name, both in *Hebrew* (*Tadmor*, which signifies a *Palm-Tree*) and in *Latin* (*Palmira*:) and the whole Country is thence Denominated *Syria Palmirena*; and sometimes *Solitudines Palmirena*: So that the *Latines* did not *Change* but only *Translate* the old Name, which therefore still obtains in these *Eastern* Parts, and the more *Modern* is wholly unknown. The City it self appears to have been of a large Extent, by the Space now taken up by the *Ruins*; but there are no Footsteps of any *Walls* remaining, nor is it possible to judge of the Ancient Figure of the Place. The present Inhabitants, as they are Poor, Miserable, Dirty People, so they have shut themselves up, to the Number of about 30 or 40 Families, in little Hutts made of Dirt, within the *Walls* of a spacious Court, which enclosed a most Magnificent *Heathen Temple*. Hereinto also we Entred, the whole Power of the Village, if I may so call it, being gathered together at the Door, whether to stand upon their Defence, in case we proved Enemies, (for some of them had their Guns in their Hands) or out of meer Curiosity to gaze upon us, I know not. However, our *Guide*, who was an *Arab*, whom *Assyne*, their present King, had sent to Conduct us through the whole Voyage, being a Man known among them, we had an easie Admittance, and with a great many welcomes in their Language were led to the *Sheck's* House, with whom we were to make our Abode. And

to mention here what the Place at first View Represents; Certainly the World it self cannot afford the like Mixture of *Remains* of the greatest *State* and *Magnificence*, together with the Extremity of *Filth* and *Poverty*. The nearest Parallel I can think of, is that of the *Temple of Baal*, Destroyed by *Jehu*, and converted into a *Draught-House*. And if, what is not improbable, this very place was a *Temple of Jupiter Belus*, the Similitude will run upon all Four.

The whole Inclosed space is a *Square* of 220 *Yards* each side, encompass'd with a High and Stately *Wall*, built of large square Stone, and Adorn'd with *Pilasters*, within and without, to the number (as near as we could compute by what is standing of the *Wall*, which is much the greater part) of 62 on a Side. And had not the Barbarity of the *Turks*, Enemies to every thing that is Splendid and Noble, out of a vain Superstition, purposely Beat down those Beautiful *Cornishes* both here and in other Places, we had seen the most Curious and Exquisite *Carvings* in *Stone*, which perhaps the World could ever Boast of; as here and there a Small *Remainder*, which has escaped their Fury, does abundantly evidence. The *West* side, wherein is the Entrance, is most of it broken down, and near the Middle of the *Square*, another Higher *Wall* Erected out of the *Ruins*; which shews to have been a Castle Strong but Rude; the Old Stones and many *Pillars* broken or sawn asunder, being roll'd into the *Fabrick*, and ill Cemented. Within were to be seen the *Foundations* of another *Wall*, which probably might answer the *Front*; and that the *Mamelukes*, whose Workmanship it seems most likely to have been, Built the *Castle* here for the Security of the Place. Before the whole Length of this New *Front*, except a narrow Passage which is left for an Entrance, is Cut a Deep *Ditch*, the Ascent whereof on the Inner side is fac'd with Stone to the very Foot of the *Wall*, which must have render'd it very Difficult to have Assaulted it. The Passage to, and the Door it self, is very narrow, not wider than to receive a Loaded *Camel*, or that two Footmen may well walk a-breast. And as soon as you are within the First Door, you make a short Turn to the Right, and pass on to another of the like bigness, which leads into the *Court*. But all this is but a New Building upon an Old, and by this Outward *Wall* is quite shrouded that *Magnificent Entrance*, which belong'd to the First *Fabrick*; of the Stateliness whereof we were enabled to judge by the two Stones which supported the Sides of the Great *Gate*, each of which is 35 *Foot* in Length, and Artificially Carved with *Vines* and *Clusters of Grapes*, exceeding Bold and to the Life. They are both Standing, and in their Places: and the Distance between them, which gives us the wideness of the *Gate*, 15 *Foot*. But all this is now *Walled* up to the Narrow Door before mention'd. Over the little Door there is an *Inscription* in *Greek*, and also another in another *Language* and *Character*, which I never saw till in *Tadmor*, nor Understand what to make of it. From that in *Greek* we hop'd for some Information; but it will be Evident to any one that Reads it, that the Stone was brought from another Place, and casually put in there.

It is thus :

Vol. III.

T t t

TO

ΤΟ ΜΝΗΜΕΙΟΝ ΤΟΥ ΤΑΦΕΩΝΟΣ ΕΚΤΙΘΕΝΕΞΙΔΙΟΝ
 ΣΕΠΤΙΜΙΟΣ Ο ΔΑΙΝΑΘΟΣ Ο ΔΑΜΠΡΟΤΑΤΟΣ
 ΣΥΝΚΑΗΤ [ΙΚΟΣ] ΑΙΡΑΝΟΥ ΟΥ ΑΒΑΛΛΑΘΟΥ ΤΟΥ
 ΝΑΚΩΡΟΥ ΑΥΤΟΥ ΚΑΙ ΤΙΟΙΣ ΑΥΤΟΥ ΚΑΙ ΤΙΩΝΟΙΣ
 ΕΙΣ ΤΟ ΠΑΝ-ΤΕΛΕΣ ΑΙΩΝΙΟΝ ΤΕΙΜΗΝ.

Fig 64.

Under this was the *Unknown Character*, which I shall here give you a *Specimen* of, as well as it could be taken.

The Letters between these [] *Marks* were not Legible, but I have ventured to *Supply* the *Defect*, as also you will see in some others following. Neither was the Ε in ΜΝΗΜΕΙΟΝ upon the *Stone*, but was doubtless omitted by *Mistake*: and the *Inscription* is nothing else, but the *Inscription* of a *Sepulcher*, the like to which we saw several. And as for the other *Character*, it being added almost under every *Greek Inscription* we saw, and rarely found Alone, I am apt to believe it the *Native Language* and *Character* of the Place, and the Matter it contains, nothing else but what we have in the *Greek*.

As soon as you are enter'd within the Court, you see the *Remainders* of 2 Rows of very Noble *Marble Pillars*, 37 Foot high, with their *Capitals* of most exquisite *Carved Work*; as also must have been the *Cornishes* between them, before by Rude and Superstitious Hands they were broken down. Of these there are now no more than 58 Remaining Entire: but there must have been a great many more, for they appear to have gone quite Round the Whole Court, and to have supported a most spacious double *Piazza* or *Cloyster*. Of this *Piazza*, the *Walks* on the West side, which is oppos'd to the *Front* of the *Temple*, seem to have exceeded the other in Beauty and Spaciousness; and at each End thereof are two *Niches* for *Statues* at their full Length, with their *Pedestals*, *Borders*, *Supporters*, and *Canopies*, *Carved* with the greatest Artifice and Curiosity. The Space within this once Beautiful Enclosure, which is now fill'd with nothing but the Dirty Huts of the Inhabitants, I conceive to have been an Open Court, in the midst whereof stands the *Temple*, Encompassed with another Row of *Pillars* of a different Order, and much Higher than the former, being above 50 Foot High. Of these Remain now but 16. But there must have been about Double that Number, which, whether they Enclosed an Inner Court, or supported the Roof of a *Cloyster*, there being now nothing of a Roof remaining, is uncertain. Only one Great Stone lies down, which seems to have reacht from these *Pillars* to the *Walls* of the *Temple*. The whole Space contain'd within these *Pillars*, we found to be 59 Yards in Length, and in Breadth near 28. In the Midst of which Space is the *Temple*, Extending in Length more than 33 Yards, and in Breadth 13, or 14. It points North and South, having a most magnificent *Entrance* on the West, exactly in the Middle of the Building, which, by the small *Remains* yet to be seen, seems to have been one of the most Glorious Structures in the World. I never saw *Vines* and *Clusters* of *Grapes* Cut in Stone so Beld, so Lively, and so Natural in any place. Just over

over the *Door*, we could make a shift to discern part of the *Wings* of a large *Spread Eagle*, Extending the whole Wideness thereof. The Largeness whereof led me at first to imagine it might have been rather a *Cherub* overshadowing the *Entrance*, there being nothing of the Body Remaining to guide one's Judgment, and some little *Angels* or *Cupids* appear still in the Corners of the same Stone. But afterwards seeing other *Eagles* upon Stones that were fallen down, I conclude this must have been one likewise, only of a much larger Size. Of this *Temple* there is nothing at present but the outward Walls standing, in which it is observable, that as the *Windows* were not large, so they were made narrower towards the Top, than they were below, but all adorn'd with excellent *Carvings*. Within the Walls, the *Turks*, or more probably *Mamelukes*, have built a *Roof*, which is supported by small *Pillars* and *Arches*; but a great deal lower, as well as in all other Respects disproportionate and inferiour to what the *Ancient Covering* must have been. And they have converted the Place into a *Mosque*, having added to the South End thereof New Ornaments after their manner, with *Arabick Inscriptions* and Sentences out of the *Alcoran* wrote in Flourishes and Wreaths, not without Art. But at the North End of the Building, which is shut out of the *Mosque*, are *Relicks* of much greater Artifice and Beauty. Whether they were in the Nature of *Canopies* over some *Altars* plac'd there, or to what other Use they serv'd, I am not able to Conjecture. They are beautify'd with the most curious *Fretwork* and *Carvings*; In the midst of which is a *Dome* or *Cupola*, above 6 Foot Diameter, which we found above to be of one Piece: whether Hewn out of a Rock Entire, or made of some *Artificial Cement* or Composition, by time harden'd into a *Lapideous Substance*, seems doubtful; tho' I am rather inclin'd to believe the latter. It is, in Fine, a most Exquisite Piece of Workmanship, and on which I could have bestow'd more time to view it, than what was allowed us.

Having past by the *Ruins* of a handsome *Mosque*, we had the Prospect of such *Magnificent Rains*, that if it be Lawful to frame a Conjecture of the Original Beauty of that Place, by what is still remaining, I question somewhat whether any City in the World could have challeng'd Precedence of this in its Glory.

Advancing towards the North, you have before you a very Tall and Stately *Obelisk* or *Pillar*, consisting of 7 Large Stones, besides its *Capital* and the Wreathed Work about it; the *Carvings* here, as in all other places, being Extraordinary Fine. The Height of it is above 50 Foot, and upon it, I conceive, may have stood a *Statue*, which the *Turks*, Zealous Enemies of all *Imagery*, have Thrown down, and Broken in pieces. 'Tis in Compass, just above the *Pedestal*, 12 Foot and a half. On each Hand of this, towards the *East* and *West*, you see two other Large *Pillars*, each a Quarter of a *Mile* distant from you, which seem to have some Correspondence one to the other. And there is a Piece of another, standing near that of the *East*, which would encline one to think, there was once a continued *Row* of them. The Height of this to the *East* I took with my *Quadrant*, and conclude

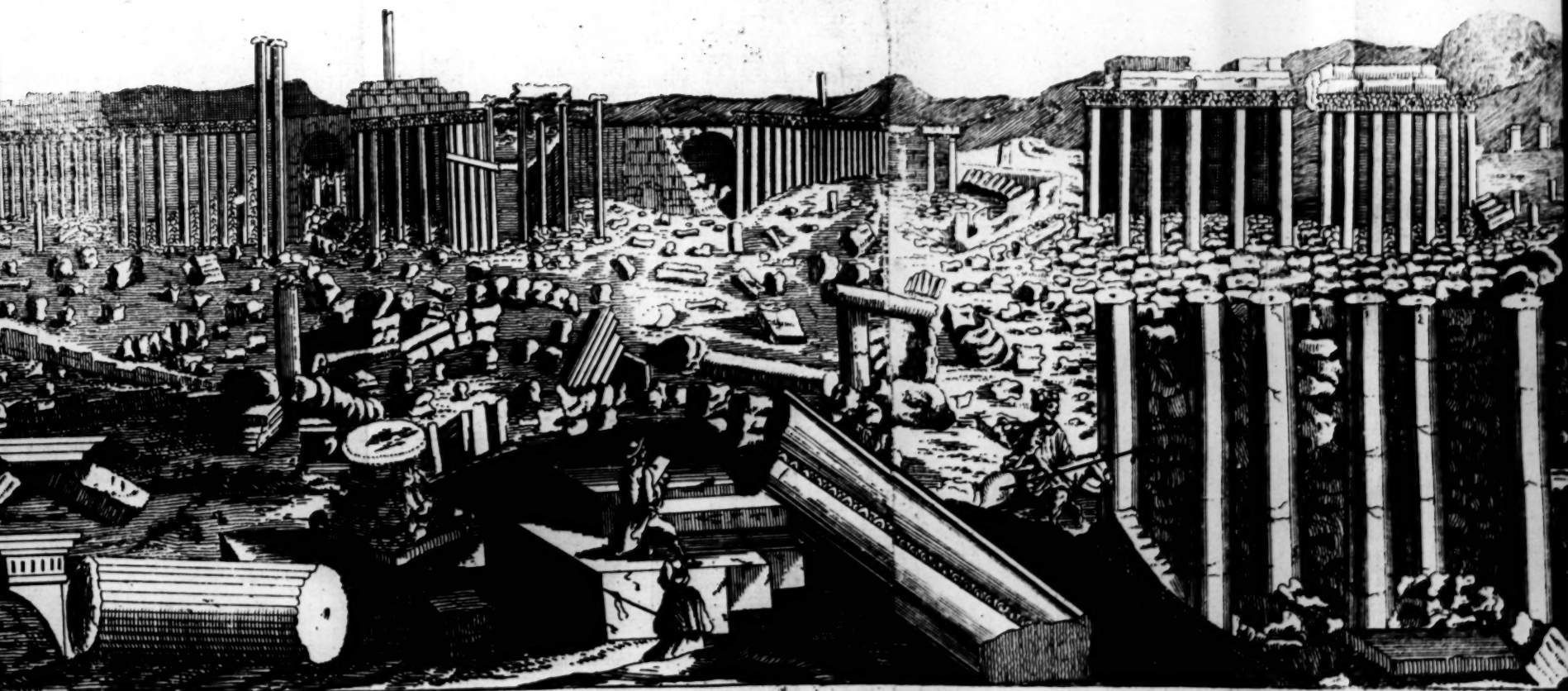
clude to be more than 42 Foot High, and the Circumference Proportionable. Upon the Body thereof is the following *Inscription*.

Η ΒΟΤΑΗ ΚΑΙ Ο ΔΗΜΟΣ ΑΛΙΛΑΜΕΝΑ ΠΑΝΟΥ ΜΟΚΙΜΟΥ
ΤΟΥ ΑΙΡΑΝΟΥ ΤΟΥ ΜΑΘΘΑ ΚΑΙ ΑΙΡΑΝΗΝ ΤΟΝ ΠΑΤΕΡΑ
ΑΥΤΟΥ ΕΤΣΕΒΕΙΣ ΚΑΙ ΦΙΛΟΠΑΤΡΙΔΑΣ Κ[ΑΙ] ΠΑΝΤΙ ΤΡΟΠΩ
[ΕΥ] ΣΕΙΜΩΣ ΑΡΕΣΑΝΤΑΣ ΤΗ ΠΑΤΡΙΔΙ ΚΑΙ ΠΑΤΡΙΟΥΙΣ
ΘΕΟΙΣ ΤΕΙΜΗΣ ΧΑΡΙΝ ΕΤΟΥΣ Ν Τ Α ΜΗΝΟΣ ΞΑΝΔΙΟΥ.

It seems Evident by this and some following *Inscriptions*, that They were a *Free State*, Govern'd by a *Senate* and *People*, though perhaps under the Protection of greater *Empires*; the *Parthians*, it is probable, first, and afterwards the *Romans*, who for a long time Contended for the Mastery here in the East. And this Government might continue among them till about the Time of *Aurelian*, who demolisht the Place, and Led *Zenobia*, Wife of *Odenatus*, Captive to *Rome*: who, though she be call'd *Queen*, yet I find not that ever her Husband had the Title of *King*; but was only one of the Chief Inhabitants, a Leading Man in the *Senate* (as 'tis probable these *Alilamanes* and *Airanes* were before him) who, while the *Romans* were busied in *Europe*, made himself great here, and by his own Force repell'd the *Parthians*; who having Master'd whatever was held by the *Romans* on the other side of *Euphrates*, made an Incurfion into *Syria*, but were by *Odenatus* driven back beyond the River. In the Course of these Wars *Odenatus* was Slain: but his Wife *Zenobia*, being a Woman of a Masculine Spirit, not only kept her Ground against her Enemies Abroad, but maintain'd her Authority at Home, keeping the Government in her Hands. Afterwards out of a Desire to cast off the *Roman Yoke*, she caus'd the whole Garrison, which was left there by *Aurelian*, to be barbarously cut off. Which bringing *Aurelian* back with his Army, he quickly took the City and destroy'd it, putting the Inhabitants to the Sword, and carrying *Zenobia* Captive to *Rome*; which was the Fatal Period of the Glory of that Place. This Custom of theirs of running up their *Genealogies* or *Pedigrees* to the 4th or 5th Generation, shews them to have borrow'd some of their Fashions from their Neighbours the *Jews*, with whom it is not unlikely they had of Old great Commerce; and perhaps many of them were Descended from that People, *Zenobia* herself being said to have been a *Jewess*: Or else, this must have been the Manner of all the *Eastern Nations*. Their *Era*, or Account of Time, they begin from the Death of *Alexander the Great*, as the *Syrians* generally do: the very *Christians* at this Day following the same Usage. Yet though they Mark the Date of the Year by *Greek Letters*, you may Observe they place them a different way from the *Greeks*, setting the Lesser Number first, as if they were to be read Backward, from the Right Hand to the Left; Ν Τ here, Denoting 450. The 3d Letter Α I take to stand for the Day of the Month, viz. the Last of *Xandicus*, which is with us *April*; this and other Names of Months which are found in other *Inscriptions*, being Borrow'd from the *Macedonians*, with very little Variation. That they were

This last *Inscription* seems to have been put in Memory of an *Embassy*,
perform'd by those Men that are Named therein, for Settling a Commerce
and Traffick, which was to their Satisfaction Accomplisht. But with
whom,





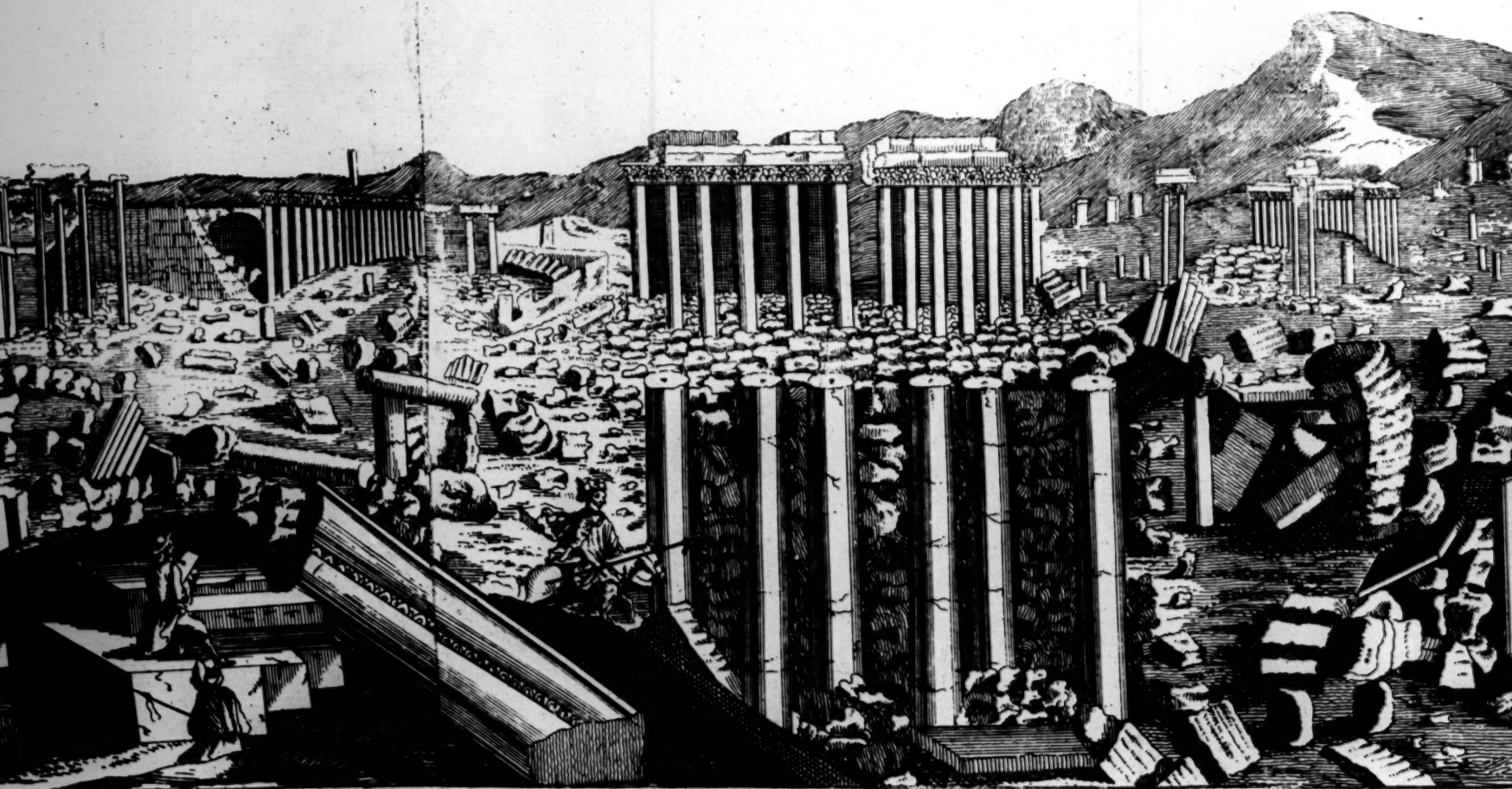
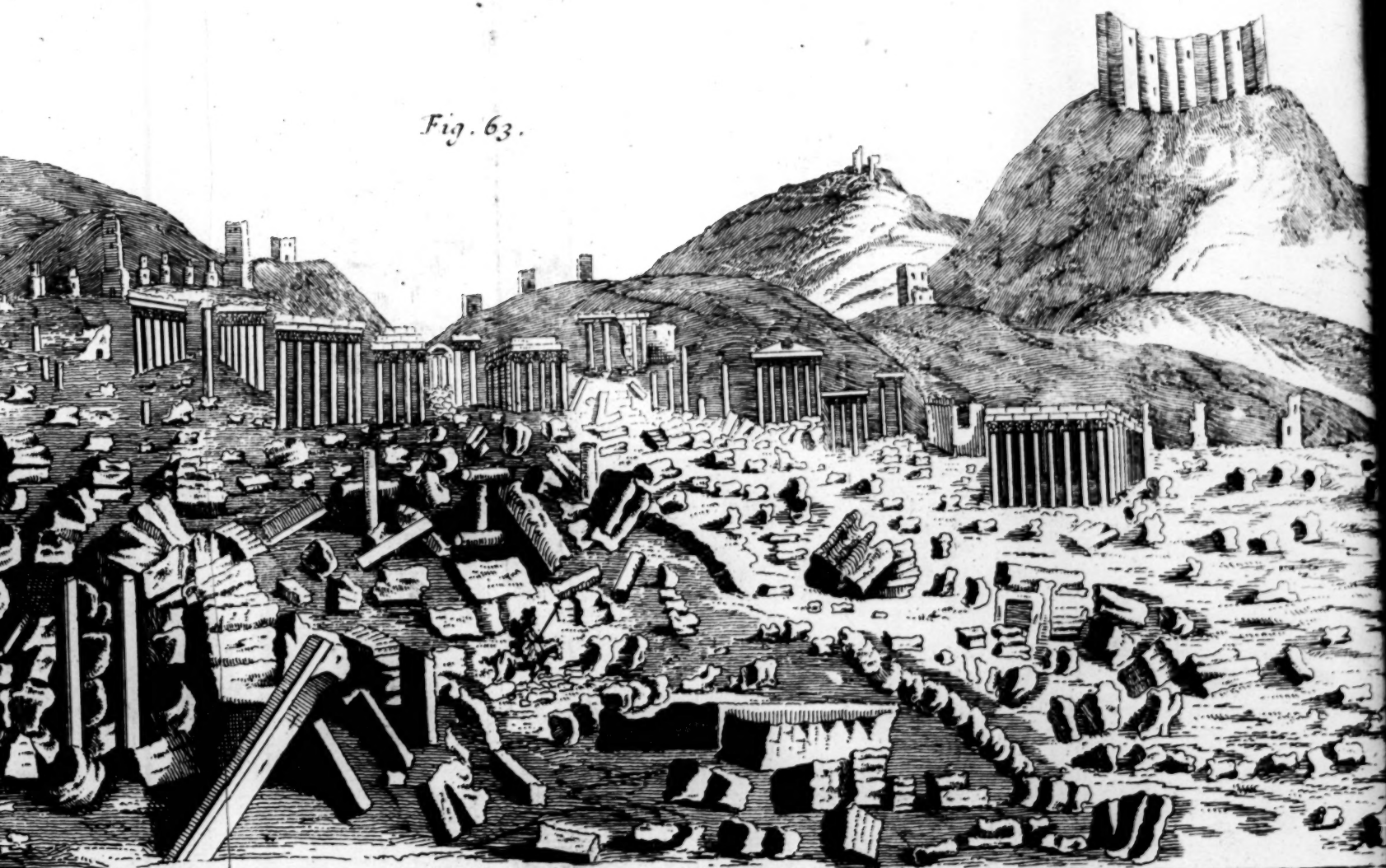


Fig. 63.



Day of the Month, viz. the Last of Xandicus, which is with us April; this and other Names of Months which are found in other Inscriptions, being Borrow'd from the Macedonians, with very little Variation. That they were

were *Idolaters* is plain by the mention of their Country Gods, both here and in other Places; So that their Commerce with the *Jews*, did not, it seems, bring them to the Knowledge of the True God; or else they must have Degenerated therefrom, and Relaps'd into *Idolatry*. The other *Pillar* towards the West in Height and Circumference answers this, and has upon the side the following *Inscription* Engraved.

Η ΒΟΥΛΗ ΚΑΙ Ο ΔΗΜΟΣ ΒΑΡΕΙΞΕΙΝ ΑΜΠΙΚΑΜΟΤ ΤΟΥ
ΙΑΡΙΒΛΕΟΤΣ ΚΑΙ ΜΟΚΙΜΟΝ
ΤΙΟΝ ΑΥΤΟΥ ΕΤΣΕΒΕΙΣ ΚΑΙ
ΦΙΛΟΠΑΤΡΙΔΑΣ ΤΕΙΜΗΧ ΧΑΡΙΝ.....

The Date of this is not Legible, neither does one Know what Judgment to make of the Thing it self. That such a *Pillar* should be Erected only to support the *Inscription*, and Convey these Mens Names to After ages, without particularizing what they Did to Deserve that Honour, is something Strange: unless we may suppose it was a Prevailing *Vanity* in these *Eastern* Countries, thus to endeavour to Eternize their Fame; an Instance whereof we have in *Scripture*, in *Abshalom's* setting up a *Pillar*, and perhaps before him, in *Saul*. Otherwise it may appear no Improbable Conjecture, that the *Pillar* was Erected long before upon some other Occasion, and afterwards made use of to this End: And I look upon it as past all Doubt, that several other *Inscriptions*, which we saw, were much more Modern than the *Pillars* on which they were Engrav'd.

2 King. 18. 18.

1 Sam. 15. 32.

Proceeding forward, directly from the *Obelisk*, about 100 *Paces*, you come to a Magnificent *Entrance*, Vastly Large and Lofty, and for the Exquisteness of the Workmanship not Inferior to any thing before Describ'd. This *Entrance* Leads you into a Noble *Piazza* of more than Half a Mile Long (930 *Yards* according to our Measuring) and 40 *Foot* in Breadth, Enclos'd with 2 Rows of Stately *Marble Pillars*, 26 *Foot* High, and 8 or 9 About. Of these Remain Standing and Entire 129; but by a moderate Calculation, there could not have been less than 560. Covering there is none Remaining, nor any *Pavement* at the Bottom, unless it be Bury'd under the Rubbish: But upon almost all the *Pillars* we found *Inscriptions*, both in *Greek* and the *Language Unknown*, of which we had but Time to take these Few, and those not very Instructive.

ΙΟΥΑΙΟΝ ΑΥΦΑΙΟΝ ΖΕΒΕΙΔΑΝ ΜΟΚΙΜΟΥ ΤΟΥ
ΖΕΒΕΙΔΟΥ ΑΣΘΡΟΒΑΙΔΑΟΙ ΣΥΝ
Α[Τ]ΓΩ ΚΑΤΕΛΘΟΝΤΕΣ ΕΙΣ ΟΛΟΓΕΣΙΑΔΑ ΕΝ Π
ΟΡΟΙΑΝ ΕΣΤΗΚΑΝ ΑΡΕΚΑΝΤΑ ΑΥΤΟΙΣ ΤΕΙΜΗΧ
ΧΑΡΙΝ ΞΑΝΔΙΚΩ ΤΟΥ ΗΝΘ ΕΤΟΥΣ

This last *Inscription* seems to have been put in Memory of an *Embassy*, perform'd by those Men that are Named therein, for Settling a Commerce and Traffick, which was to their Satisfaction Accomplisht. But with whom,

whom, till I can find out what Place is meant by ΟΛΟΤΕCΙΑΔΑ, I must remain Ignorant. I am unwilling to entertain any thoughts of *Getia* in *Macedonia*, or of *Olgassus*, a Place mention'd by *Strabo* in *Bithynia*, which comes a little nearer the Name : being both so Remote, and the City of *Tadmor* so ill contriv'd for a Place of Trade, being far from the Sea, and without the Advantage of any River. Yet the *Magnificence* of the Place shews they have not wanted Riches among them : And their *Salt* is a Commodity which still brings them in a Considerable Advantage. The order of the *Numeral Letters* you may take notice is again Inverted ; but taking them the Right way, the Year 558 falls in with the last Year of *Alexander Severus*, which is of our Lord 234.

About the Middle of the *Piazza*, upon another *Pillar*, was this following Inscription :

Η ΒΟΥΛΗ ΚΑΙ Ο ΔΗΜΟΣ ΙΟΥΛΙΟΝ ΑΥΡΗΛΙΟΝ ΖΗΝΟΒΙΟΝ ΤΟΝ ΚΑΙ
ΖΑΒΔΙΑΝ ΔΙCΜΑΛΧΟΤ ΤΟΥ ΝΑCCOΤΜΟΥ CΤΡΑΤΗΓΗCΑΝΤΑ ΕΝ
ΕΠΙΔΗΜΙΑ ΘΕΟΥ ΑΛΕΞΑΝΔΡΟΥ ΚΑΙ ΤΗΡΕΤΗCΑΝΤΑ ΠΑΡΟCΙΑ
ΔΙΗΝΕΚΕΙ ΡΟΥΤΙΛΙΟΥ ΚΡΙCΠΕΙΝΟΥ ΤΟΥ ΗΓΗΣΑΜΝΕΟΥ ΚΑΙ ΕΠΙΔΗ-
ΜΗCΑCΑΙC ΟΥΗΕΙΛΛΑΤΙΟCΙΝ ΑΓΟΡΑΝΟΜΗCΑΝΤΑΤΕ ΚΑΙ ΟΥΚΟΝΙ-
CΩΝΑ ΦΕΙΔΗCΑΝΤΑ ΧΡΗΜΑΤΩΝ ΚΑΙ ΚΑΛΩC ΠΟΛΕΙΤΕΤC ΑΜΕΝΟΝ
«C ΔΙΑ ΤΑΤΤΑ ΜΑΡΤΥΡΗΘΕΝΤΑ ΤΠΟ ΘΕΟΥ ΙΑΡΙΒΩΛΟΥ ΚΑΙ ΤΠΟ ΙΟΥ-
ΛΙΟΥ ΤΟΥ ΕΞΟΧΩΤΑΤΟΥ ΕΠΑΡΧΟΥ ΤΟΥ ΙΕΡΟΥ ΠΡΑΙΤΕΡΙΟΥ
ΚΑΙ ΤΗΣ ΠΑΤΡΙΔΟC ΤΟΝ ΦΙΛΟΠΑΤΡΙΝ ΤΕΙΜΗC ΧΑΡΙΝ ΕΤΟΥC
Δ Ν Φ.

This is as perfect an *Inscription* as any I met with, by the help of which we may make a Judgment of all the rest ; at least thus far, that they were put up in Memory of some, who had behav'd themselves, in those Publick Offices they bore, either in their Own Republick or under the *Romans*, with Commendation : this being a Publick Place, where their Names and Worthy Actions were Recorded and Transmitted to Posterity. What I further observ'd particularly in this, was the want of the Name after ΙΟΥΛΙΟΥ, and took notice of the like Space Vacant in the other *Language* under it : and in both Places it seem'd to be not Worn out with Time, but Voluntarily Scratcht out : Which Confirms me in the Opinion that they are both one, and that the *Unknown* was the *Vulgar*, as the *Greek* was the *Learned Language* of the Place.

Upon another *Pillar* in the same *Walk* was this ;

CΕΠΤΙΜΙΟΝ ΟΥΟΡΩΔΗΝ ΤΟΝ ΚΡΑΤΙCΤΟΝ ΕΠΙΤΡΟΠΟΝ CΕΒΑCΤΟΥ
ΔΟΥΚΗΝΑΡΙΟΝ ΚΑΙ ΑΡΟΠΕΤΗΝ ΙΟΥΛΙΟC ΑΥΡΗΛΙΟC ΕΛΑΜΗC
ΚΑCCIΑΝΟΥ ΤΟΥ Μ[Ε]ΛΕΝΑΙΟΥ ΠΠΕΤC ΡΩΜΑΙΩΝ ΤΟΝ ΦΙΛΟΝ ΚΑΙ
ΠΡΟCΤΑΤΗΝ ΕΤΟΥC Η Ο Φ . . ΜΗΝΕΙ [Ε] ΑΝΔΙΚΩ.

From another *Pillar* in the same *Piazza* was Transcrib'd this Broken *Inscription* which follows : which I have endeavour'd to make up from the former,

former, believing them in Substance the very same, with little Alteration of Names.

ΣΕΠΤΙΜ[ΙΟΝ ΟΥΡΩΔΗΝ] ΤΟΝ ΚΡΑ [ΤΙΣΤΟΝ ΕΠΙΤΡΟ]ΠΟΝ ΣΕ-
ΒΑΣ[ΤΟΥ ΔΟΥΚ]ΗΝΑΡΙΟΝ ΚΑ[Ι ΑΡΩΑΠΕ]ΤΗΝ ΙΟΥΛΙΟΥ ΑΥ[ΡΗΛΙ]ΟΥ
Ε[ΛΑΜΗC] ΠΥΛΑCΟC Μ[ΕΛΕΝΑΙ]ΟC ΜΑΛΛΩΧΑΝΑCΟΥ ΜΟ[Τ]Ο ΚΡΑΤΙ-
CΤΟC ΤΩΝ [ΦΙΛΟΝ] ΚΑΙ ΠΡΟCΤΑΤΗΝ ΤΕΙΜΗC ΕΝΕΚΕΝ ΕΤΟΥC . . . ,
[ΜΗΝΕΙ Ξ] ΑΝΔΙΚΩ.

What we may Collect from both these *Inscriptions*, and divers others of a like Import, is, That as the *State*, the *Senate*, and *People*, did sometimes Honour those that had been in Publick Trust with *Inscriptions* on these *Pillars*: So when this was not done by them, *Private* Persons had the Liberty to do the same for their *Friends*. And I shall give you an Instance by and by of one Engraven by a *Husband* in Memory of his *Wife*.

Upon several of these *Pillars* are little *Pedestals* Jetting out about the Middle of them, sometimes one way only, and sometimes more, which seem to have been the *Bases* or Standing Places of *Statues*. On these *Pedestals* we saw many *Inscriptions*, sometimes when there was none upon the Body of the *Pillar*, and sometimes when there were. As for Instance this that follows upon the *Pedestal*, thus;

ΣΕΠΤΙΜΙΟΝ ΑΙΡΑΝΗΝ ΟΔΑΙΝΟΘΟΥ ΤΟΝ ΑΛΑΜΠΡΟΤΑΤΟΝ
CΥΝΚΛΗΤΙΚΟΝ.

and upon the *Body* of the *Pillar*, this Imperfect one;

ΕΞΑ. . . . ΝΤΩΝ ΑΥΡΗΛΙ. . . . ΡΗΛΙΟΥ ΔΩΡ. . . . CΤΡΑΤΙΩΤΗC ΑΕ. . . .
ΚΗC ΤΩΝ ΠΑΤΡΩΝ ΤΕΙΜΗC ΚΑΙ ΕΥΧΑΡΙCΤΙΑC ΧΑΡΙΝ ΕΤΟΥC Τ Ξ Φ.

We see they esteem'd it very Honourable to have their Memories Preserved after this manner; but it is but little Knowledge of them we can get from hence, save now and then the *Time* when they Liv'd. As here, 563 *Years* after the Death of *Alexander*, reach to the Year of our Lord 239.

Another *Inscription* in the same *Piazza* was thus;

Η ΒΟΥΛ [Η ΚΑΙ ΟΔΗ] ΜΟC ΣΕΠΤΙΜΙΟΝ ΤΟΝ ΚΡΑΤΙCΤΟΝ Ε[ΠΙ-
ΤΡΟΠΟΝ C]ΕΒΑCΤΟΥ ΔΟΥΚΗΝ[ΑΡΙΟΝ]. . . . ΕΟΔΟΤΗΝ ΤΗC ΜΗΤ[ΡΟ-
ΚΟΛΩ]ΝΕΙΑC ΚΑΙ ΑΝΑΚΟΜΙCΑ[ΝΤΑ Τ]ΑC CΥΝΟΔΙΑC ΕΞ ΙΔΙΩΝ ΚΑΙ
ΜΑΡΤΥΡΗΘΕΝΤΑ ΤΠΟ ΤΩΝ ΑΡΧΕΜΠΟΡΩΝ ΚΑΙ ΑΛΑΜΠΡΩC CΤΡΑΤΗ-
ΤΗCΑΝΤΑ ΚΑΙ ΑΓΟΡΑΝΟΜΗCΑΝΤΑ ΤΗC ΑΤΤΗC ΜΗΤΟΚΟΛΩΝΕΙΑC ΚΑΙ
ΠΛΕΙCΤΑ ΟΙΚΟΘΕΝ ΑΝΑΛΩCΑΝΤΑ ΚΑΙ ΑΡΕCΑΝΤΑ ΤΗΤΕ ΑΥΤΕ ΒΟΥΛΗ
ΚΑΙ ΤΩ ΔΗΜΩ ΚΑΙ ΝΥΝΕΙ ΑΛΑΜΠΡΩC CΥΜΠΟCΙΑΡΚΟΝ ΤΩΝ ΤΟΥ ΔΙΟΥ
ΒΗΛΟΥ ΙΕ[Ρ]ΩΝ ΤΕΙΜΗC ΕΝ ΕΚ ΕΝ ΕΤ ΞΑΝΔΙΚΩ.

This

This affords a sufficient Confirmation of what I before observ'd, That these were Honorary *Inscriptions*, in Memory of those that had behav'd themselves well in *Publick Offices*; of which we have several mention'd here, whereof some are very well Known, but the Others not easy to be met with in *Books*. By the Word ΜΗΤΡΟΚΟΛΩΝΕΙΑC we may be Assured, that though this City was Reduc'd by the *Romans* into the Form of a *Colony*, yet it had a peculiar Mark of *Honour* set upon it, to Signify that it was the Chief of their *Colonies* in these *Oriental Parts*; that the Authority also of their *Senate* and *People* was Continu'd to them; And besides, that there was a *Society* of Men, either *Curators* of the *Temple* of *Jupiter Belus*, (to whom the *Temple* before Describ'd perhaps was Dedicated) or *Overseers* of the *Sports* and *Festivals* that were Celebrated in Honour of him, of which Sodality this *Septimius* was, when this *Inscription* was made, a *Sympostarch*, perhaps their *Chief* and *Governour*. By this too we find they did not wait for the *Deaths* of those they thus *Honoured*, before they provided for the Preservation of their *Memories*: but *Famous Men* were thus *Registred* for *After-Ages* even while they were *Alive*.

Upon one of these *Pedestals* before Describ'd, not far from the Former, was the following *Inscription*; which I valu'd the more for the little Remainder it has preserv'd of the Name of *Palmyra*, by which the Place was Known to the *Romans*.

... ΤΗΛΑΙΟΝ ΟΥΡΩΔΗΝ [CYNKA] ΗΤΙΚΟΝ ΚΑΙ ΒΟΥΛΕΥΤΗΝ ΠΑΛ-
ΜΥΡΗΜΟΝ ΒΗΛΑ ΚΑΒΟCΑΡCΑ ΤΟΝ ΦΙ[ΛΟΝ] ΤΕΙΜΗC ΧΑΡΙΝ ΕΓΟΤC
Ο Φ.

The Upper End of this *Spacious Piazza* was shut in by a *Row* of *Pillars*, standing somewhat closer than those on each Side; and perhaps there might have been a kind of *Banquetting House* above, but now no certain Foot-steps thereof remain. But a little farther to the Left Hand, and, it may be, continu'd with the former *Walk*, lie the *Ruins* of a very *Stately Building*, which I am apt to believe might have been for such an Use. 'Tis Built of a better *Marble*, and has an Air of *Delicacy* and *Exquisiteness* in the *Work*, beyond what is Discernable in the *Piazza*. The *Pillars* which Supported it, are of *One Entire Stone*: and on one of them that is fallen down, but so Firm and Strong that it has receiv'd no Injury thereby, we Measur'd and found 22 *Foot* in Length, and in *Compass* 8 *Foot* and 9 *Inches*. Among these *Ruins* we found the only *Latin Inscription* we saw in the Place, and that so Imperfect, there is but little of it Intelligible.

.....es Orbis & Propagatores Generis Humani D. D. N. N.
Diocletianus.ssimi Imp. Et Constantius & Maximinianus
Nobb. Cas. Castra feliciter condiderunt.

And upon the same *Stone* a little lower,

.....

..... ntes *Ossiano Hieroclete, V. P. Praef. Provincia D. N. M. O. Eorum.*

The Name of *Maximianus Hercules*, who was Partner in the Empire with *Dioclesian*, which should have follow'd in the *Inscription*, seems to have been on purpose scratch'd out, and defaced, for what reason I cannot guess. The rest is lost by the breaking of the *Stone*.

In the West side of the great *Piazza* are several Openings for *Gates*, leading into the Court of the *Palace*: Two whereof, one would easily believe when they were in their perfection, were the most *Magnificent* and *Glorious* in the World, both for the *Elegancy* of the *Work* in general; and particularly for those stately *Prophry Pillars* with which they were adorn'd. Each *Gate* had 4, not standing in a Line with the others of the *Walls*, but placed by Couples in the *Front* of the *Gate* facing the *Palace*; two on one Hand, and two on the other: Of these remain but two entire, and but one standing in its Place. They are about 30 *Foot* in Length, and 9 in Circumference: Of a Substance so exceeding hard, that it was with great difficulty we broke off a few Shivers to bring home with us for a Pattern of the *Stone*; the *Art* of making which I think, is quite lost. We saw several other broken pieces of *Porphyry*, but neither of so accurate a Mixture and Composition, nor so large as the former.

The *Palace* it self is so entirely ruined, that no Judgment can be made what it was in its ancient Splendour, either for the Figure or Workmanship thereof. There is only here and there a broken piece of a *Wall* remaining beat into pieces by violence, and consum'd by time to that Degree, that without the help of a *Tradition* we could hardly be well assur'd, that a *Royal Palace* did once fill that space. We may guess however, that it *Fronted* the famous *Piazza* before mention'd, and was surrounded with Rows of *Pillars* of different *Orders*: many of which are still standing, some plain and some wrought and channell'd as those immediately encompassing the *Temple*. And upon those little *Pedestals*, which stood out of the middle of some of them, I observ'd several *Inscriptions*, but could not conveniently take more than one, which together with the *Pillar* that supported it was fallen to the Ground. 'Twas this.

ΜΑΡΘΕΙΝ ΑΛΕΞΑΝΔΡΟΥ ΤΟΥ ΚΑΠΑΔΗ ΤΟΥ ΟΥΑΒΑΛΛΑΘΟΥ ΤΟΥ
 ΣΥΜΩΝΟΥ ΣΟΡΑΙΧΟΣ ΑΙΡΑΝΟΥ ΑΝΗΡ ΑΥΤΗΣ ΜΝΗΜΗΣ ΕΝΕΚΕΝ ΜΗΝΕΙ
 ΑΥΤΩ ΤΟΥ 5 Υ ΕΤΟΥΣ.

If the rest were of a like Nature with this, we have lost no great matter by not taking them, this being only a *Memorial*, which a kind *Husband* caus'd to be setup in Honour of his *Wife*. The Month *Dysrus* answers to our *March*, and the Year 490, from the Death of *Alexander the Great*, the Year of our Lord 166.

I omitted to mention before, that under the *Long Walk* runs a *Current* of *Hot Sulphureous Waters*, and there is a Well and other Passages down to them: But whatever they may have been of *Old*, they are not now so convenient as another about *half a Mile* Westward from hence; where there is a very good Descent into the *Water*, and it is still used by the People to *Bath* in. Near to which, upon the *Pedestal* of a broken *Pillar*, (or perhaps it might be an *Altar*) remains this following *Inscription*.

ΑΙΙ ΥΨΙΣΤΩ ΜΕΓΙΣΤΩ ΚΑΙ ΕΠΗΚΩ ΒΩΔΑΝΟC ΖΗΝΟΒΙΟΥ ΤΟΥ ΑΙ-
ΡΑΝΟΥ ΤΟΥ ΜΟΚΙΜΟΥ ΤΟΥ ΜΑΘΘΑ ΕΠΙ ΜΕΛΕΤΗ ΣΟΗ ΑΙΡΕΘΕΙC ΕΦΚΑC
ΠΗΓΗC ΥΠΟ ΙΑΡΙΒΑΔΟΥ ΘΕΟΥ ΤΟΝ ΒΩ [ΜΟΝ] ΕΞ ΙΔΙΩΝ ΑΝΕΘΗΚΕΝ Ε-
ΤΟΙC Δ Ο Υ ΜΗΝΟC ΥΠΕΡΒΕΡΕΤΑΙΟΥ Κ.

I am pretty confident that the Word I have mark'd with a *Line* under it, is rightly taken, and therefore know not what to guess it to be, unless the proper Name of the *Fountain*. And upon that Supposition the *Inscription* is easily Intelligible, shewing that *Bolanus*, Son of *Zenobus*, &c. being elected Over-seeer or Curator of this Fountain, under *Jaribolus*, Built this *Altar* to *Jupiter*, in the Year of *Alexander*, 474. i. e. of our Lord 150. and on the 20th of *October*, if the last *Kappa* be a *Numeral*, as I suppose it must. But who this *Jaribolus* was, on whom they bestow, as generally upon the *Roman Emperors*, whose Names occur in the *Inscriptions*, the Title of ΘΕΟC, is not so facile a Conjecture. They were under the *Parthians* before the *Romans* fell in among them; but the *Date* shews this to be after the Time of *Hadrian*, and so after their Coming. Nay, and in an *Inscription* before mention'd, which is of a *Later Date* than this by 80 Years, we have the Names of the same Person.

Hot Sulphureous Baths are things very frequent in this Country; and hence it is that it obtain'd the Name of *Syria Salutifera*. The Scent of the *Water* here is much like those of *Bath* in *England*, but not so strong, neither is the Taste so offensive: On the contrary, when they have run so far from the Fountain, as to become cold, they are very potable, and are the only Water the Inhabitants use.

On the East side likewise of the long *Piazza* stands, if I may use such an Expression, a Wood of *Marble Pillars*, some perfect, and others depriv'd of their beautiful *Capitals*; but so scatter'd and confus'd, that it is not possible to reduce them into any Order, so as to Conjecture to what they Anciently served. In one Place are 11 together in a square after this manner, pav'd at the Bottom with Broad Flat Stone, but without any *Roof* or *Covering*. And at a little distance from that stands the Ruins of a small *Temple*, which by the *Remains* seem to have been for the Workmanship very Curious. But the *Roof* is wholly gone, and the *Walls* very much defaced and Consumed with time. Before the Entrance, which looks to the South, is

a *Piazza* supported by 6 *Pillars*, two on one hand of the *Door*, and two on the other, and at each End one. And the *Pedestals* of those in the Front have been fill'd with *Inscriptions*, both in *Greek* and the other *Language*; but they are now so obliterated and worn out, as not to be intelligible. The most perfect was this that follows:

ΜΑΛΕΝΤΟΝ ΚΑΙ ΑΓΡΙΠΠΑΝ ΙΑΡΧΑΙΟΥ ΤΟΥ ΠΑΛΙΟΥ ΓΡΑΜΜΑΤΕΑ
 ΓΕΝΟΜΕΝΟΝ ΤΟ ΔΕΥΤΕΡΟΝ ΕΠΙΔΗΜΙ[Α] ΘΕΟΥ ΑΔΡΙΑΝΟΥ ΑΛΙΜΜΑ
 ΠΑΡΑΧΟΤΑ ΞΕΝΟΙΟΤΕ ΚΑΙ ΠΟΛΙΤΑ[ΙC]. And a little below were
 these straggling Letters visible.

ΕΝΗ. Ν ΤΙ ΠΗΡΕΤΗCΑΝΤΑ ΤΗΤ. ΣΤΡΑΤΕΥΜΑ ΤΟΥ ΥΠΟ. . . .
 ΗΚΑΙ. . . ΤΟΝ ΝΑΟΝ ΤΟΝ. . . ΔΙΟC. . . ΝΤ. . .

I should have imagined ΚΑΙ to have been a Copulative, and the second Name *Agrippa* distinct from the former, but that the Words following in the singular Number, will not admit of such a Construction. The Person then, in Memory of whom this *Inscription* was made, must have been nam'd *Malentus Cagarippa*, who bearing such an Office as *Scribe*, or the like, in the Expedition of *Adrian* the Emperor, perform'd an Act of publick Beneficence and Generosity, both to *Strangers* and *Citizens*, denoted by the Word ΑΛΙΜΜΑ, or ἀλεμμα, which signifies *Undion*. Perhaps he distributed amongst them *Sweet Oyls*, to be used in, or after their *Bathings*. 'Tis Pity what follows is so imperfect; and especially that we cannot find out the Date: For that might have directed us to the precise Time of *Hadrian's* Expedition into these *Oriental Parts*, where he made great Conquests, and enlarg'd the Bounds of the *Roman Empire*.

But as great a Curiosity as any, were their *Sepulchres*, being *Square Towers*, 4 or 5 Stories high, and standing on both Sides of a hollow Way, towards the North Part of the City. They stretch out in Length, the Space of a *Mile*, and perhaps formerly might extend a great Way further. They were all of the same Form, but of different Splendor and Greatness, according to the Circumstance of their Founders. The first we viewed was entirely *Marble*, but is now wholly in *Ruins*, and nothing but a Heap of broken Stones, amongst which we found the Pieces of two *Statues*, one of a Man, and another of a Woman, cut in a Sitting, or rather Leaning Posture, the *Heads* and part of the *Arms* of both being broken off, but their *Bodies* remaining pretty entire; so that we had the Advantage of seeing their Habits, which appear'd very noble, but more approaching the *European Fashion*, than what is now in the *East*; which inclin'd me to think they might be *Romans*. Upon broken Pieces of Stone tumbled here and there, we found some broken *Inscriptions*, but not affording any perfect Sense, they are not worth the Transcribing.

Many other *Sepulchres* there were as much gone to decay as this, which therefore we pass'd by, to go to two which stood almost opposite to one another, and seem'd most perfect of any, though not without Marks

of the *Turkish Malice*. They are two *Square Towers*, rather larger than ordinary *Steeple*s; and 5 *Stories* high; the Outside being of common *Stone*, but the *Partitions* and *Floors* within of good *Marble*; and beautify'd too with very lively *Carvings*, and *Paintings*, and *Figures*, both of *Men* and *Women*, as far as the *Breast* and *Shoulders*; but miserably defac'd and broken. Under these *Statues*, or by their *Sides*, are in the *unknown Character*, the *Names* probably of the *Persons* there bury'd, or by them represented; or else some other *Memorials* of them. We enter'd one of these by a *Door* on the *South-side*, from which was a *Walk* cross the whole *Building* just in the *Middle*. But the *Floor* was broke up, and so gave us a *Sight* of the *Vault* below, divided after the same *Manner*. The *Spaces* on each hand were again subdivided into 6 *Partitions* by thick *Walls*, each *Partition* being capable of receiving the largest *Corps*; and piling them one above another, as their *Way* appears to have been, each of those *Spaces* might contain at least 6 or 7 *Bodies*. For the lowest, second, and third *Stories*, those *Partitions* were uniform, and altogether the same; save from the 2d *Floor*, which answer'd the main *Entrance*, one *Partition* was reserv'd for a *Stair-Case*. Higher than this, the *Building* being something contracted towards the *Top*, would not afford *Space* for the *Continuation* of the same *Method*: Therefore the two uppermost *Rooms* were not so parted, nor perhaps ever had any *Bodies* lain in them; unless it was that of the *Founder* alone, whose *Statue* wrapt up in *Funeral Apparel*, and in a lying *Posture*, is placed in a *Nich*, or rather *Window*, in the *Front* of the *Monument*, so as to be visible both within and without. Near to this *Statue* was the following *Inscription*.

ΤΟ ΜΝΗΜΕΙΟΝ ΕΚΤΙΓΑΝ ΕΑΒΗΛΕΜΑΝΝΑΙΟC. COXAEI MAAXOC
OYABAAAΘOY TOY ΜΑΝΝΑΙΟΥ TOY ΕΑΒΗΛΟΥ ΑΥΤΩ ΚΑΙ ΥΙΟΙC
ΕΤΟΥC ΔΙΥ ΜΗΝΟC ΕΑΝΔΙΚΟΥ.

'Tis a little doubtful, whether ΑΥΤΩ should not rather be made ΑΥΤΟΙC or else there must be a *Fault* in the *Verb*, and all those but the *Names* of one *Person*.

The other *Monument* on the other side of the *Way* is very much like this; only the *Front* and *Entrance* are towards the *North*, and 'tis not altogether so polite, nor so well painted. But the *Carvings* are as good, and it shews altogether as stately and magnificent as the former. Besides, it has the *Advantage* in *Age* of a whole *Century* of *Years*; as appears from the *Date* of the following *Inscription*. 'Tis placed above a *Nich* in the *Front*, adorn'd with handsome *Borders* and *Cornishes*; the *Place* doubtless of some *Statue*, and probably that of the *Founder*.

ΜΝΗΜΕΙΟΝ ΑΙΩΝΙΟΝ ΓΕΡΑC ΩΚΟΔΟΜΗCΑΝ ΓΙΧΟC ΜΟΚΙΜΟΥ TOY
ΚΑΙΑΚΙΑΑCΙCΟΥ TOY ΜΑ.....ΟΥ ΕΙCΤΕ ΕΑΥΤΟΝ ΚΑΙ ΥΙΟΥC ΚΑΙ
ΕΓΓΟΝΟΥC ΕΤΟΥC ΔΙΤ ΜΗΝΕΙ ΕΑΝΔΙΚΩ.

This is the most ancient *Inscription* I met with in *Tadmor*, the 314th Year from the Death of *Alexander the Great*, preceding the Birth of our *Saviour* about 10 Years. The other also is between 20 or 30 Years before the Reign of *Hadrian*, and consequently before the *Romans* got footing here. And from these sumptuous Structures, and these costly *Mausolæa*, we may reasonably conclude, they were a potent and opulent People, before they became subject to the *Romans*, and were not oblig'd to them for their *Greatness*.

After 4 Days stay we return'd, not the Way that we came, but proceeding Eastward towards the River *Euphrates*. In our Way to which, the 3d Day, passing through a Village call'd *Teive*, upon a Stone set wrong End upwards, in the Midst of the Wall of the *Mosque*, we met with the following *Inscription*.

ΔΙ ΜΕΓΙΣΤΩ ΚΕΡΑΥΝΙΩ ΤΙΤΕΡ ΣΩΤΗΡΙΑΣΤΡΑ: ΑΔΡΙΑΝΟΥ ΣΕΒ. ΤΟΥ
ΚΥΡΙΟΥ ΑΓΑΘΑΝΓΕΛΟΥ ΑΒΙΛΕΥΟΥ ΤΗΣ ΔΕΚΑΠΟΛΕΩΣΤΗΝ ΚΑΜΑΡΑΝ
ΚΟΔΩΜΗΣΕΝ ΚΑΙ ΤΗΝ ΚΑΙΝΗ ΕΞ ΙΔΙΩΝ ΑΝΕΘΗΚΕΝ ΕΤΟΥΣ Ε Μ Ρ
ΜΗΝΟΣ ΑΩΟΥ.

And under this was another in the same *Language* and *Character* we had seen at *Tadmor*; I was surpriz'd to find such an *Inscription* in this Place, nor can any way guess how they shou'd come by it; and the mention of *Decapolis*, makes me still more in the Dark. If one might extend the Bounds of *Decapolis*, as some are said to have done, as far as *Cælojyria*, and comprize under this Name again all *Syria*, *Phœnicia* only excepted, then need it not be brought from elsewhere, but first set up in this Village. But this will not be allow'd by those who make *Decapolis* only a part of *Palestine*. The matter of Fact it contains, is only an Account of the Magnificence of this *Agathangelus Abileus*, whoever he was, who for the Safety of the Emperor *Hadrian*, erected of his own Charges, and dedicated to *Jupiter the Thunderer*, a *Royal Banqueting-House*, (for so I take *ΚΑΜΑΡΑ* to signify) and a *Bed of State*; for after *ΚΑΙΝΗ* there is doubtless a Letter omitted, and it ought to be *ΚΑΙΝΗΝ*. The Date 445. agrees to the Year of our Lord 123. which was the 7th of the Reign of *Hadrian*. And the Month *ΑΩΟ* is our *August*.

The next Day we pass'd by the Ruins of a large *Monastery*, of the *Maronites*, as I guess it to have been, by an *Inscription* we met with upon the Capitals of several *Marble Pillars*, which supported the Middle Isle of a handsome *Church*, which was to this Effect:

† ΕΠΙ ΕΕΡΓΙΣ ΕΠΙΕΚ. ΤΣ ΕΥ ΝΓΕΝ ΜΑΡΩΝΙΣ ΤΣ ΧΩΡΕΠΙΕΚ.

From thence we pass'd on, and came the same Night to *Euphrates*; and having travell'd 2 Days on the Banks of that famous River, we came to the Tents of the King of the *Arabs*, who had furnish'd us with a Guide for our Voyage. With him we remain'd 2 Nights, and in 2 Days Tra-
vel

vel more came back safe to *Aleppo*, having been but in the whole just 18 Days.

Remarks upon
these Antiquities,
by Mr. Edmund
Halley. n. 218.
p. 160.

Antiquit. Jud.
1. 3.

4. The City of *Tadmor*, whose Remains in Ruins do with-so much Evidence demonstrate the once happy Condition thereof, seems very well to be prov'd to be the same City which *Solomon* the great King of *Israel* is said to have founded under that Name in the *Desart*, both in the 1 *Kings* 9. 19. and 2 *Chron.* 8. 16. in the Translation of which, the *Vulgar Latin Version*, said to be that of *St. Jerome* has it, *Condedit Palmyram in Deserto*. And *Josephus* tells us, That he built a City in the *Desart*, and call'd it *Tadmora*; and the *Syrians* at this Day, (says he) call it by the same Name; but the *Greeks* name it *Palmyra*. The Name is therefore *Greek*, and consequently has no relation to the *Latin Palma*, and seems rather derived from *Παλμυρός* or *Πάλμυς*, which *Hesychius* interprets βασιλεὺς πατρὸς; or perhaps from *Παλμύτης*, (which according to the same Author) was an *Egyptian* God. Neither is it the Word *תדמור* but *תמר* that in *Hebrew* signifies a *Palm-Tree*.

History is silent as to the Fate and Circumstances of this City, during the great Revolutions in the several Empires of the *East*; but it may well be suppos'd, that so advanced a Garrison as this was, being above 300 Miles from *Jerusalem*, continu'd not long in the Possession of the *Jews*, who immediately after *Solomon*, fell into civil Dissention, and divided their Force: So that it is not to be doubted, but that it submitted to the *Babylonian* and *Persian* Monarchies, and afterwards to the *Macedonians* under *Alexander* and the *Seleucids*. But when the *Romans* got Footing in these Parts, and the *Parthians* seem'd to put a stop to their farther Conquests in the *East*, then was this City of *Palmyra* by reason of its Situation, being a Frontier, and in the midst of a vast sandy *Desart*, where Armies could not well subsist to reduce it by Force, courted and caress'd by the contending Princes, and permitted to continue a *Free-State*, a *Mart*, or *Staple* for Trade, for the Convenience of both Empires, as is abundantly made out from the Words of *Appian* and *Pliny*.

De Bell. Civil.
lib. 5.

Appian tells us, That *M. Antonius*, after his Victory at *Philippi*, about 40 Years before *Christ*, sent his Horses to plunder the City of *Palmyra*, pretending only that they were not sufficiently in the *Roman* Interest. *ὅτι Ῥωμαίων καὶ Παρθυσίων ὄντες ἐφορῶντες ἐκάλειπες ἐμπόριον εἶχον*, and that being *Merchants*, they convey'd the *Indian* and *Arabian* Commodities by the way of *Persia* into the *Roman* Territories, though the true Reason was their Riches: But the *Palmyrenes*, being inform'd of their Design, took Care to prevent them, and so escap'd Plunder; and this Attempt of *Antony*'s occasion'd a Rupture between the two Empires.

Nat. Hist. lib. 5.

The Words of *Pliny*, above an 200 Years after, do likewise testify that this City then continu'd in the same Enjoyment of their Liberties. *Palmyra Urbis nobilis situ, Divitiis Soli, atque Aquis Amœnis, vasto undique ambitu Arenis includit Agros, ac velut Terris exempta à Rerum Natura, privata sorte inter duo Imperia Summa Romanorum Parthorumque, & prima in Discordiâ semper utrinque Cura*. Whereby it appears not only

only that it was a *Common-Wealth* in the time of *Vespasian*, but the Situation thereof is truly describ'd as it were an Island of *Fertile Land*, surrounded with a Sea of *Barren Sands*. Such Spots *Strabo* tells us, were frequent in *Libya*, and by the *Aegyptians* were called *Abases*, whence possible the Name of the *Abassyne* Nation is deriv'd.

With the Advantages of *Freedom*, *Neutrality*, and *Trade*, for near two Centuries, 'tis not strange that it acquir'd the *State* and *Wealth* answerable to the Magnificence of these Noble Structures. But when the Romans under *Trajan* had made it appear, that there was no Comparison between the Puissance of the *Parthians* and them, (*Trajan* having taken *Babylon* and *Ctesiphon*, the then Seat of the *Parthian* Empire,) the *Palmyreni* were at length determin'd to declare for the *Romans*; which they did, by submitting themselves to the Emperor *Adrian*, about the Year of *Christ* 130, when *Adrian* made his Progress through *Syria* into *Aegypt*. And that Magnificent Emperor being highly delighted with the native Strength and Situation of the Place, was pleased to adorn and rebuild it. When, as 'tis likely, he bestow'd on it the Privileges of a *Colony Juris Italici*, which it enjoy'd (as *Ulpian* assures us): And the Inhabitants of the City, in Gratitude were willing to call themselves *Hadrianopolita*, Ἡδριανούπολις ἡ πόλις ὑπὸ τοῦ αὐτοκράτορος, (says *Stephanus*.) Nor is it unlikely that many of those *Marble Pillars* were the Gift of that Emperor, and particularly those of the *Long Porticus*; for that none of the *Inscriptions* are before that Date; and it was usual for the *Cæsars* to present Cities that had oblig'd them, with *Marble Pillars* to adorn their publick Buildings. These here were not far to fetch, the Neighbouring Mountains affording the *Marble Quarries*: But the Magnitude of the *Porphry Column* is indeed very remarkable, considering how far those vast Stones must have been brought by Land-carriage to this Place; it being not known that any other Quarries yield it, except those of *Aegypt*, which lie about midway between *Cairo* and *Siena*, between the *Nile* and the *Red-Sea*: the Stone being very valuable for its Colour and Hardness, and for that it rises in Blocks of any Magnitude requir'd. And it is a great Mistake of those who suppose it *Fæditious*.

From the time of *Adrian* to that of *Aurelian*, for about 140 Years, this City continu'd to Flourish and Increase in Wealth and Power, to that Degree, that when the Emperor *Valerian* was taken Prisoner by *Sapores*, King of *Persia*, *Odenathus* one of the Lords of this Town (which Name occurs in several of these *Inscriptions*) was able (whilst *Gallienus* neglected his duty both to his Father and Country) to bring a powerful Army into the Field, and to recover *Mesopotamia* from the *Persians*, and to penetrate as far as their Capital City *Ctesiphon*. Thereby rendring so considerable Service to the *Roman* State, that *Gallienus* thought himself oblig'd to give him a share in the Empire: Of which Action, *Trebellius Pollio* (in the Life of *Gallienus*) has these Words, *Laudatur ejus* (*Gallieni*) *optimum factum, qui Odenatum Participato Imperio Augustum vocavit, ejusque Monetam, quæ Persas Captos traheret, Cudi jussit: quod & Senatus & Urbs & omnis Aetas gratanter accepit*. The same, in many Places, speaks of this *Odenathus* with

with great Respect; and mentioning his Death, he says, *Iratum fuisse Deum Reip. credo, qui interfecto Valeriano noluit Odenatum reservare.* But by a strange Reverse of Fortune, this Honour and Respect to *Odenathus* occasion'd the sudden Ruin and Subversion of the City. For he and his Son *Herodes* being Murder'd by *Maonius*, their Kinsman, and Dying with the Title of *Augustus*, his Wife *Zenobia*, in right of her Son *Waballathus* then a *minor*, pretended to take upon her the Government of the *East*, and did administer it to Admiration: and when soon after *Gallierus* was Murder'd by his Soldiers she grasp'd the Government of *Egypt*, and held it during the short Reign of the Emperor *Claudius Gothicus*. But *Aurelian* coming to the Imperial Dignity, would not suffer the Title of *Augustus* in this Family, though he was contented that they should hold under him as *Vice Cæsaris*, as plainly appears by the *Latin Coins* of *Aurelian* on the one side, and *Waballathus* (which Name is often found in these *Inscriptions*) on the other, with these Letters V. C. I M. O R.; which *P. Harduin* has most judiciously Interpreted, *Vice Cæsaris Rector Imperii Orientis*, but without the Title of *Cæsar* or *Augustus*, and with a *Lawrel* instead of a *Diadem*. But both *Waballathus* and *Zenobia* are styl'd *CEBACTOI* in the *Greek Coins*, made, 'tis probable, within their own Jurisdiction. Two of the *Latin* I have seen, and they are as describ'd, excepting the Points.

But nothing less than a *Participation* of the *Empire* contenting *Zenobia*, and *Aurelian* persisting not to have it dismember'd; he march'd against her, and having in two Battles routed her Forces, he shut her up, and besieg'd her in *Palmyra*: and the besieg'd finding that the great Resistance they made, avail'd not against that resolute Emperor, they yielded the Town: and *Zenobia* flying with her Son, was pursu'd and taken, with which *Aurelian* being contented, spar'd the City, and leaving a small Garrison, march'd for *Rome* with this *Captive Lady*: But the Inhabitants believing he would not return, set up again for themselves, and (as *Vopiscus* has it) slew the Garrison he had left in the Place. Which *Aurelian* understanding, though by this time he was gotten into *Europe*, with his usual Fierceness, speedily return'd; and collecting a sufficient Army by the way, he again took the City without any great Opposition, and put it to the Sword with an uncommon Cruelty, (as he himself confesses in a Letter extant in *Vopiscus*.) and deliver'd them to the Pillage of his Soldiers. And 'tis observable that none of the *Greek Inscriptions* are after the Date of this calamity, which befell the City in or about the Year of *Christ* 272, as far as may be collected, after it had been 9 or 10 Years the Seat of the *Empire* of the *East*, not without Glory.

In this appears also the great *Utility* of *Coins* to illustrate Matters of *History*; for by them alone 'tis made out, that there was such a Prince as *Waballathus*, *Vopiscus* singly mentioning him by the Name of *Balbatas*. And from the same *Coins* it appears that *Odenathus* had the Title of *Augustus* 4 Years, and *Waballathus* 6 at least; and that the First Year of *Aurelian* was the 4th of *Waballathus*. And by the Testimony of *Pollio*, *Odenathus*

nathus was declar'd Emperor of the East, Gallieno & Saturnino Coss. which was An. Christi 263, and dy'd before Gallienus, but in the same Year, viz. An. 267, which, by the Coins, was the first of Waballathus. He therefore immediately succeeded Odenathus, and was without doubt his Eldest Son by Zenobia, and not his Grandson, the Son of Herodes, as some Learned Men have suppos'd: For if Zenobia could not endure that Herodes, Son of Odenathus by a former Wife, should succeed his Father in prejudice to her Children, and for that reason was consenting to his Murther (as Pollio intimates in Herodes and Maonius) much less would she endure the Title of Augustus in the Son of Herodes, and especially when her own Sons were, as 'tis probable, Elder than such Grandson. So that 'tis most likely that Herennianus and Timolaus, whom Pollio reckons among his XXX Tyrants, might be the younger Sons of Zenobia, on whom also out of Motherly Affection, she might bestow the same Titles of Honour.

But it must be observ'd, that in the Greek Coins, this Prince's Name is usually written ΑΥΤ ΕΡΜΙΑC ΟΥΑΒΑΑΑΘΟC ΑΘΗΝΟΥ as Trifan says, he found it upon several Medals: but Patin has the last Word only ΑΘΗ. I should be glad to peruse some of these curious Coins, especially if found in or near Palmyra; but I am inclinable to believe that his true Name was Eranes Waballathus (as was one of his Progenitors, in the first Inscription of Dr. Halifax) though perhaps the remoter Cities of Asia and Ionia, might by mistake write it Hermias. And 'tis probable that ΑΘΗΝ. might be for the first Letter of the Name ΟΑΗΝΑΘΟC, which in Syriac begun with an Aleph; and the Δ was with those People us'd instead of Θ as we see the Month Xanthicus, written Ξανθικός in many of these Inscriptions, which doubtless was pronounced like D blasum, or the Saxon D.

Though this City were at that time so roughly treated by Aurelian, yet it is certain that he did not burn it, or destroy the Buildings thereof: And though Zosimus on this occasion uses the Words τὴν πόλιν καὶ ἀσπίδας, yet that seems only to relate to his Demolishing the Walls and Defences of the Place; and that Emperor's own Letter extant in Vopiscus, doth sufficiently shew that he spar'd the City it self; and that he took care to re-instate the beautiful Temple of the Sun that was there which had been plunder'd by his Soldiers. However the damage then sustain'd was never retriev'd by the Inhabitants, and I do not find that ever this City made any Figure in History after it: yet the Latin Inscription, seems to intimate, as it Dioclesian had restor'd their Walls within 30 Years after. About the Year of Christ 400, it was the Head-Quarters of the Legio Prima Illyricorum; and though Stephanus gives it no better title than πόλις, yet it appears to have been an Arch-bishop's See, under the Metropolitan of Damascus. To say in what Age, or from what hand, it receiv'd its final Overthrow, which reduc'd it to the miserable Condition it now appears in, there is no Light in any of our Historians, but it is probable it perish'd long since in the Obscure Ages of the World, during the Wars of the Saracen Empire; and being burnt and desolated, it was never rebuilt, which occasions the Ruins to lie so entire, in a manner as they were left, nei-

ther being used to other Structures on the place, nor worth carrying away, because of the great distance thereof from any other City.

As to the Geographical Site of *Palmyra*, *Ptolemy* places it in the Latitude of *Tripoly* on the Coast of *Syria*, and 4 Deg. more Easterly, viz.

παλμύρα οα ε. λδ.

And he makes it the Capital of 16 Cities in *Syria Palmyrena*, whereof *Alalis*, *Danaba* and *Evaria* were afterwards *Bishops Sees*. *Pliny* calls it CCIII Miles from the nearest Coast of *Syria*, and CCCXXXVII from *Seleucia ad Tygrim* near *Bagdat*, (which Numbers are erroneously Printed 252, and 537 in most Editions, contrary to the Authority of the MSS.) *Josephus* places it one Day's Journey from *Euphrates*, and six from *Babylon*, which must be understood of *Horseman's Journeys* of about 60 Miles per diem, it being more than so much from this City to *Euphrates*. *Ptolemy* also mentions a River running by *Palmyra*, which did not appear to our Travellers, unless that Gut or Channel wherein they were overflow'd by the Rain-waters were the Bed thereof; which may, possibly, run with a constant Stream in the Water, or times of much Rain: but this, (as the Rivers of *Aleppo* and *Damascus* at this Day) is made by *Ptolemy* to have no Exit; but to go off in Vapour, and to be imbibed by the thirsty Earth of these Deserts.

B. p. 168.
D. 204. P. 921.

N. 218.

The *Æra*, or Account of *Tears*, observ'd by the *Palmyreni* in these Inscriptions, is evidently that of *Seleucus*, call'd afterwards *Dbilcarnain* or *Bicornis*, by the *Arabians*, and by them kept in use till above 900 Tears of *Christ*, and not that of the Death of *Alexander*. This may be Demonstrated from the 5th Inscription of Dr. *Halifax*, wherein *Alexander Severus* is styl'd ΘEOC; that is, after the Death and Consecration of that Emperor, or after the Tear of our Lord 234; and from the Name of *Julius*, who when this Inscription was put up, was *Præfatus Prætorio*, (and could be no other than *Julius Philippus Arabs*, who might be esteem'd by the *Palmyreni* as their Countryman,) it follows, that it was in the last Year of *Gordian*, Ann. Chr. 242, or 243: And that Emperor being soon after Murder'd by the Treachery of this *Philip*, who succeeded him: and his Treason coming afterwards to Light, 'tis not strange that his Name was purposely effac'd in this Inscription. The Date thereof An. 554, shews the Beginning of this Account 311, or 312 Tears before *Christ* coincident with the *Æra* of *Seleucus*, which was likewise observ'd by several other Cities in the East.

I shall not undertake the part of a Critick on these Inscriptions, but only make some few Remarks on them, such as occur'd whilst they pass through my Hands.

1. That the more ancient of these Inscriptions dated before the Tear 500, do nowhere make use of *Roman Prænomena*, which are yet very frequent in them that follow, particularly *Julius*, *Aurelius* and *Septimius*, taken up by these People out of Respect to the Emperors that bore those Names; and consequently that *Septimius Odænathus* was most probably the same, who was afterwards

terwards *Augustus*. That Name growing in use in the Reign of *Septimius Severus*, under whom, or his Son *Caracalla*, this *Odenathus* was certainly Born. And this Monument being Erected by him whilst he was yet a private Man; and he afterwards attaining the Imperial Dignity, it was necessary the *Inscription* of his Tomb (which perhaps was that single one that was all of *Marble*) should be chang'd: Upon which occasion this Stone might be brought back into the Town, and after its Destruction, be clapt up casually over the little Gate-way where now it stands.

2. ΚΑΤΕΘΟΝΤΕΣ ΕΙΣ ΟΛΟΓΕΙΑΔΑ ΕΝΠΟΡΟΙΑΝ ΕΤΗΚΑΝ: *Descendentes Vologesiada Commmercium stabiliverunt, An. 558. five An. Christi 247.* Whereby it appears, that this People having had their Trade interrupted by the Wars between the Romans and the Persians, under *Gordian*, did now send an Embassy to the Court of *Sapores*, King of the Persians, to get it Re-establish'd, which succeeded according to their Desires. *Vologesia* was a City built by *Vologeses*, King of the Parthians in the time of *Nero*, on the *Euphrates* below *Babylon*: *Ptolemy* calls it οὐλογεσίας; *Stephanus*, βολογεσίας; *Ammianus*, *Vologesia*; and *Pliny* *Vologesocirta*.

Hal. Inscr. 4.

3. ΚΑΙ ΟΥΚ ΟΙΚΕΙΩΝ ΑΦΕΙΛΗΚΑΝΤΑ ΧΡΗΜΑΤΩΝ. I submit it to the judgment of the Criticks, whether this Faulty place may not be amended, by reading it ΟΥΚ ΟΙΚΕΙΩΝ ΑΦΕΙΛΗΚΑΝΤΑ, &c. as likewise whether ΔΙΣΜΑΛΧΟΥ in the same Inscription may not be instead of ΜΑΛΧΟΥ ΤΟΥ ΜΑΛΧΟΥ, which is the ingenious Conjecture of that excellent Grammarian Mr. Will. Baxter.

Hal. Inscr. 5.

4. *Septimium Vorodem Procuratorem Ducenarium Augusti, &c.* ΑΡΟΑ ΠΤΗΝ. This Word, if Greek, is faultily transcrib'd; and in one Copy I have seen, the O is very small, as I suppose it on the Stone; which might occasion the Transcribing thereof without it in the former Voyage: So that it is most probable, that it is the Remains of some other Letter almost worn out. I conjecture it to have been ΑΡΤΑΓΕΤΗΝ, Π being taken for Γ, and that this *Septimius* was *Præfæctus Annonæ*, having the care to see that the City were sufficiently provided with Bread; which was a most necessary Officer in a Place that must needs be furnish'd with Corn from abroad. And this same *Septimius*, in another Inscription is styl'd..... ΕΘΑΘΗΝ ΤΗC ΜΗΤΡΟΚΟΛΩΝΕΙΑC ΙCΓΕ ΚΡΕΘΑΘΗΝ, which should signify that he was Distributor of the Emperor's Munificence in *Flesh* to the People. These Inscriptions bear Date in April An. Dom. 267. not long before the Death of *Odenathus*, who is herein styl'd ΕΒΑΚΤΟC: and 'tis not improbable but he might institute such a Custom, as at the Publick charge to give the People a Large of *Flesh* on particular Days, to reconcile them to the Dominion of their Fellow Citizen. This is certain, that *Aurelian* first instituted such a Custom of giving *Flesh* at Rome: The Words of *Vopiscus* are, *Idem Aurelianus & Porcinam Carnem Populo Romano distribuit, quæ bodieque dividitur*; which Custom continu'd till the time of *Constantine*, when (according to *Zosimus*) one *Lucian*, who had this Office of Distributing

Hal. Inscr. 6.

Vid. Sæf. XI.
1. Inscr. a.

Hal. Inscr. 10.

Swine's Flesh at *Rome*, had Interest enough among the People to set up *Maxentius* for Emperor; and *Salmasius* assures us, that it was not discontinued till the time of *Heracleus*. It will not therefore seem strange, if I suppose *Aurelian* might find that custom at *Palmyra*, and at his return from thence institute the like at *Rome*.

I am inclin'd to believe that not only the 6, 7, and 10 *Inscriptions* of *Dr. Halifax*, but also the 11, were in Honour of the same *Septimius Vorodes*, who seems to have been a great Favorite of *Odanathus*, and was without doubt respected by the *Romans* on that account, whom I conclude to have Effaced all the *Memorials* of *Zenobia* and *Waballathus*, inasmuch that no one appears, among those many taken, that was set up during the 6 Years they reign'd. The Name *Vorodes* seems the same with *Orodes*, which was the Name of the King of the *Parthians* that slew *Craffus*: and the *Persians*, having about 40 Years before expell'd the race of the *Arsacids*, 'tis not improbable but the *Remains* of that *Royal Family* might fly for succour to *Palmyra*, and this *Vorodes* might be one of them.

Hal. Inscr. 8.

5. In two other Copies of these *Inscriptions*; the 8th is read, ΣΕΠΤΙΜΙΟΥ ΑΙΩΓΥΛΩ ΟΔ'ΑΙΩΔΩ, and not ΟΔ'ΑΙΩΔΩ, as in this Copy, and perhaps ought rather to be ΟΔ'ΑΙΩΔΩ, as being the *Inscription* under a Statue of the same *Odanathus*, who is here, as well as on his Tomb, styl'd *Illustrissimus Patricius*, but without a Date.

Hal. Inscr. 5.
Gr. 14.

6. ΥΠΟ ΙΑΡΙΒΩΛΟΥ ΘΕΟΥ. It cannot well be doubted, but that this *Deus Jaribolus* is the same with what *Gruter* and *Spon* (in the first of his *Inscriptions*) reads ΑΓΑΙΒΩΛΩ. By the Figure of the *Idol* extant in *Spon*, it appears that this *God* was made with the *Moon* upon his Shoulders, and consequently was the *Deus Lunus* worship'd by the *Syrians*, whose Name in the Language of that Country, could not be better express'd than by *Jarebbol* יָרֵב בֹּוֹעַל *Dominus Lunus*. Whence I am induced to believe, that *Gruter* mistook it ΑΓΑΙΒΩΛΩ for ΑΓΑΙΒΩΛΩ, the I in the Beginning, and the lower part of the round stroke of the P, being Effaced, so as to pass for Γ.

By the way it is remarkable, that the Person who Dedicated this *Monument*, in *Gruter* and *Spon*, is sty'd Δ. ΑΥΡ. ΗΑΙΟΔΩΡΟC; and the same Name occurs in a broken *Inscription* which *Mr. Halifax* omitted, as being too imperfect. It stood on the right Hand of the entrance into the little Temple, and was thus.

ΛΟΥΚΙΟΥ ΑΥΡΗ[ΑΙ]ΟΥ ---- ΗΑΙΟΔΩΡΟΥ ΤΟΥ

Hal. Inscr. 9.

And after a Blank of 3 Lines all worn out except one single O, there follow'd,

[ΤΕΙ]ΜΗC ΧΑΡΙΝ ΕΤΟΥC ---- ΜΗΝΟC [ΑΠ] ΕΛΛΑΙ[ΟΥ]

And that imperfect 9th *Inscription* seems to have relation to the same Name.

7. ΜΑΛΕΝ-

7. ΜΑΛΕΝΤΟΝ ΚΑΙ ΑΓΡΙΠΠΑΝ *lege* ΜΑΛΗΝ ΤΟΝ ΚΑΙ ΑΓΡΙΠΠΑΝ, it being written ΜΑΛΗΝΤΟΝ, with H in two other Copies I have seen, whereby the Sense is clear'd. Hal. Inscr. 15.

8. ΑΓΑΘΑΝΓΕΛΟΣ ΑΒΙΛΗΝΟΣ ΤΗΣ ΔΕΚΑΠΟΛΕΩΣ, *Agathangelus Abilanus Decapolitanus; Patronymicè.* There was in those Parts two Cities known by the Name of *Abila*, to distinguish which, the one was call'd *Abila Lyfania*, from the Name of the *Tetrarch*, St. Luke c. 3. 1. and is placed by *Ptolemy* (in his *Calosyria*) about midway between *Damascus* and *Helopolis*: The other in *Judea*, call'd *Abila ad Jordanem*, describ'd by *Josephus*, in many Places, to lie over against *Fericho*, near the *Dead-Sea*. *Decapolis* was so call'd from its ten Cities, enumerated by *Pliny*: And with them he reckons up, among others, the *Tetrarchy* of *Abila*, in the same *Decapolis*: which demonstrates the *Abila Decapolis*, and *Abila Lyfania*, to be the same Place. And tho' it cannot be deny'd, but that some of *Pliny's* ten Cities are not far distant from that near *Jordan*; yet it doth not appear that ever this other had the Title of a *Tetrarchy*. Here it is to be observ'd, that what *Pliny* calls *Decapolis*, *Ptolemy* makes his *Calosyria*; and the *Calosyria* of *Pliny*, is that part of *Syria* about *Aleppo*, formerly call'd *Chalcidene*, *Cyrbisice*, &c. Hal. Inscr. 18. Lib. V. & 18.

What this Town of *Teibe* was anciently call'd, is not so easily conjectur'd: But if the Numbers of *Ptolemy* may be confided in, it is very near the Situation of a City he calls *Oriza*; and perhaps his *Adada* may be our *Soukney*, and his *Rasapha*, what is now call'd *Arjoffa*.

It is taken for granted, that old *Aleppo* was anciently the City of *Berrhaa*, and there wants not ancient Testimonies to prove it; which being granted, I think, I may without scruple Conclude, that *Adrene*, mention'd in both the Voyages, is the Ruins of the City *Androna*; and *Esfree* that of *Seriane*, both mention'd in the *Itinerary* of *Antoninus*, in the Journey, à *Dolicà Seriane*. But this whole Country is laid about half a Degree more Southerly than it ought, by *Ptolemy*, who places *Berrhaa* in Lat. 36 Deg. For the Meridian Altitude of the Tropical Sun at *Aleppo* is found but 77 Deg. whence the Lat. 36 Deg. 30 Min. as it was observ'd there, An. 1680. by 3 several Quadrants.

By the same Observation a much greater Error is amended in the Altitude of *Aleppo*, in the *Rudolphine Tables* of *Kepler*, who supposes *Aleppo* to have been the ancient *Antiochia ad Taurum*, and accordingly places it in Lat. 37 Deg. 20 Min. wherein he is follow'd by *Bullialdus* and others; and several Maps have copy'd the Mistake. But a much greater use of it is, that thereby we are assur'd, that the City of *Araffa*, wherein *Albatani* made his Observations was without doubt, the same which is now call'd *Racca* on the *Euphrates*; of which Town an account may be seen in *Ranwolf's* Voyages, and which was not many Miles below the Place, where our Travellers first came on the River: And if *Arecca* in the Language of this Country, relates to *Victory* (as is said above) it was doubtless, anciently the City *Nicephorion* built by *Alexander the Great*; with which the Situation exactly agrees. vid. os. 2.

An Inscription
in the Language
of the Palmyreni,
by Mr. O'Savien
Pulley. n. 328.
p. 537.
Msc. p. 3.

Fig. 65.

XLI. Dr. *Halifax* calling at *Rome* in his Return home from *Aleppo*, *An.* 1696 enjoyn'd me to find out the *Inscription* in the Language of the *Palmyreni* mention'd by Dr. *Spon*. I waited upon *S. Fabretti*, Canon of *St. Peters*, and by him I was fully inform'd to my Purpose. He lent me also a Draught of it, which I carry'd to *Vinea Cesarini* about a *Mile* without the *Porto del Popolo*, to compare it with the *Original*; but I found it not *Exact*. Wherefore I took a wet Paper, and having first clear'd the Letters with a *Bodkin*, laid it on the *Characters*, and pressing it with my *Handkerchief* took it off very fair, then letting it dry I went over it with my *Pen*.

On the top of the *Cypress* which is upon one of the sides of the *Marble* there is a *Label* for an *Inscription*, tho' nothing upon it, and just below it on the left side, part of a *Boy* appears out of the *Tree* with a *Lamb* upon his *Shoulders*, which is omitted in Dr. *Spon*. The *Stone* appear'd to me to have remain'd unmolested for some time, because from the *Ground*, the *Inscription* was over-run with *Ivy*, the *Wood* of which had crept into the *Letter*, and over the *Gryphons* and *Figures* above it.

Draughts of several
Inscriptions
and Characters at
Persepolis by Mr.
F. A. n. 201. p.
775.

Fig. 66, & 67

XLII. 1. I have lately retriev'd some *Fragments* of *Papers* relating to *Antique* and *Obscure Inscriptions* at *Persepolis*, taken in *Nov.* 1667, by *Mr. S. Flower*, Agent in *Persia* for our *E. I. Company*, who dy'd suddenly soon after, and left them dispers'd in several *Hands*.

Fig. 66, 67. These two *Characters* are Engraven on the *Breast* of two *Horses* cut out of the *Mountain of Black-Marble* at *Nofturestand*, distant a *League* from *Chahelmanare*, or the ancient *Persepolis*, one whereof is said to be *Alexander's* the other *Rufram's* (a famous *Hero*, suppos'd to have Liv'd about the time of *Cambyfes*.) *Mr. Flower*.

Fig. 66. This *Character* hath some *Similitude* with the ancient *Hebrew*: but the *Persians* would have it their own, though they understand not a *Letter*. *Mr. F.*

Fig. 68.

Fig. 69.

Fig. 68. These two *Lines* were writ entire on *Rufram's Horse*. *Mr. F.*

Fig. 69. This is the (*Arabick*) *Persian Character* Engraven at *Persepolis* not above 500 *Tears* since, and is little different from the *Writing* used at this *Day*. *Mr. F.*

Fig. 70.

Fig. 70. This *Character*, whether it be the ancient *Writing* of the *Gaures* or *Gabres*, or a kind of *Telesmes*, is found only at *Persepolis*, being a part of what is there Engraven on *White-Marble*, and is by no *Man* in *Persia* *Legible*, or *Understood* at this *Day*.

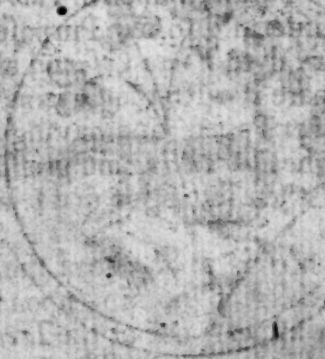
A *Learned Jesuit Father*, who Deceas'd 3 *Tears* since, affirm'd this *Character* to be known and us'd in *Agypt*. *Mr. F.*

It seems *Written* from the *Left Hand* to the *Right*, and to consist of *Pyramids*, diversly posited, but not *Joyn'd* together. As to the quantity of the *Inscriptions*, *Herbert* reckon'd in one large *Table* 20 *Lines* of a prodigious *Breadth*. Of this sort here are distinct *Papers*, each of several *Lines*.

Fig. 71.

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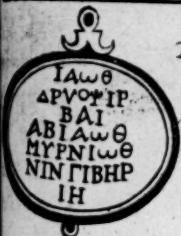
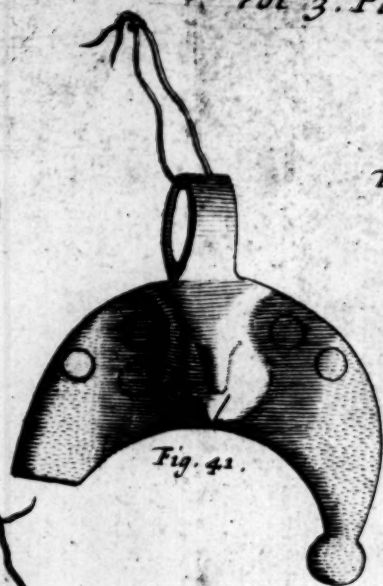
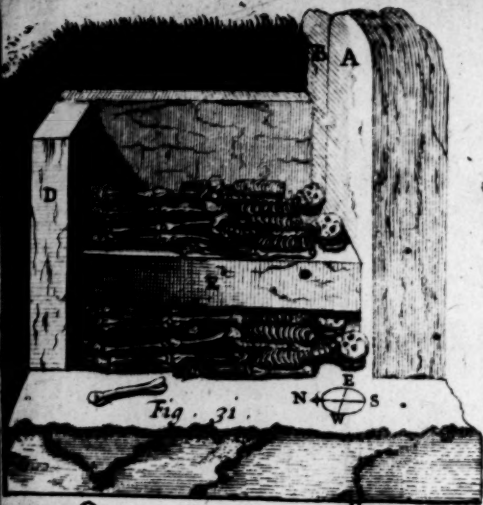


Fig. 33.



Fig. 34.



Fig. 32.



Fig. 36.



Fig. 37.



Fig. 38.



Fig. 39.



Fig. 56.



Fig. 57.



Fig. 44.

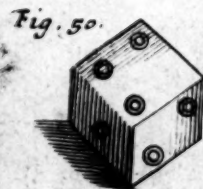


Fig. 50.

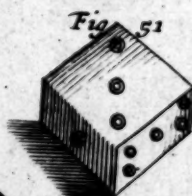


Fig. 51.

Fig. 58.

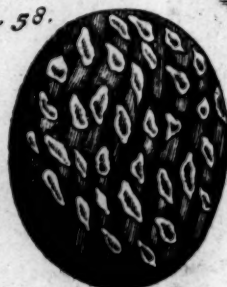


Fig. 59.



Fig. 61.



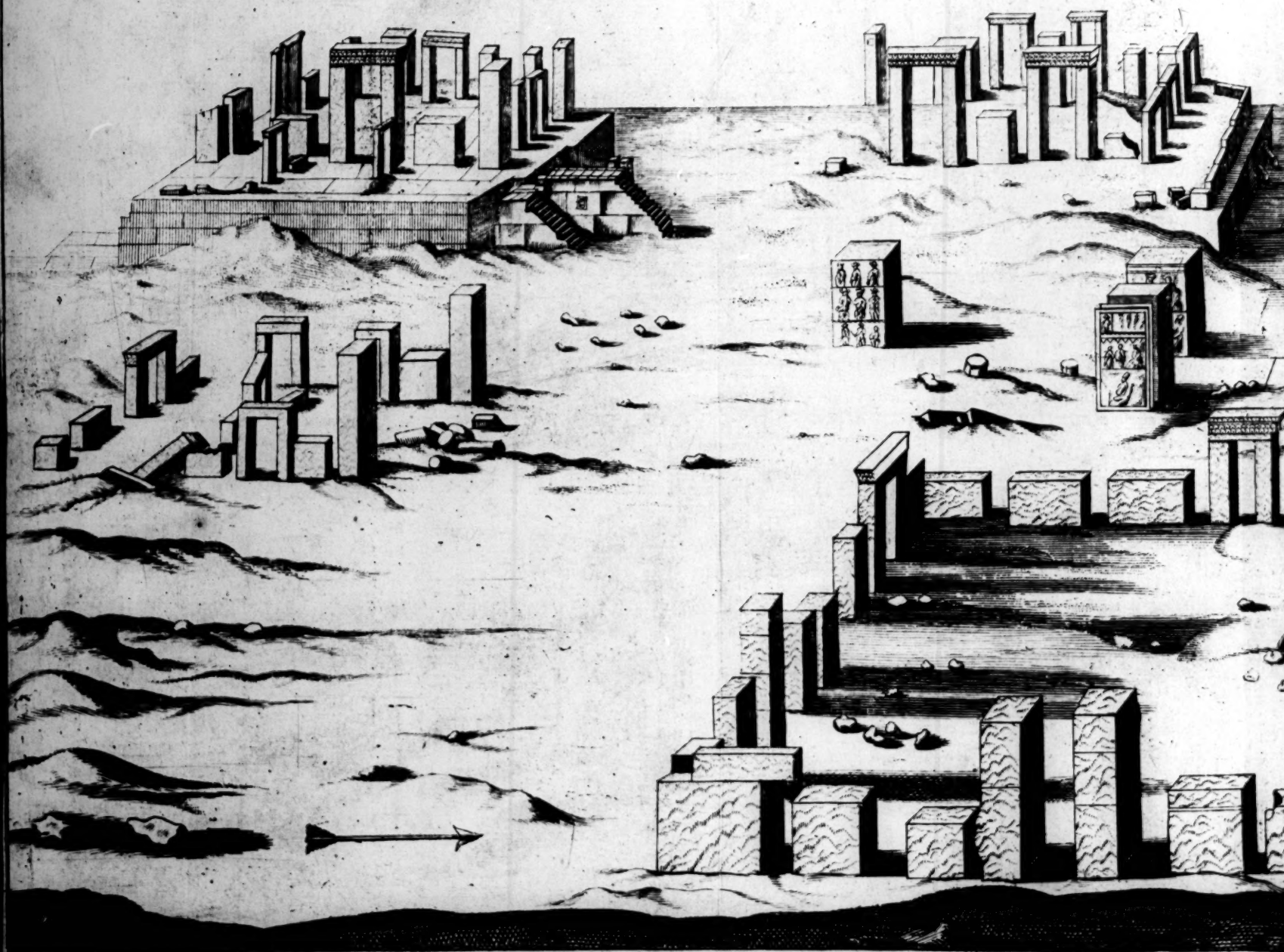
Fig. 47.

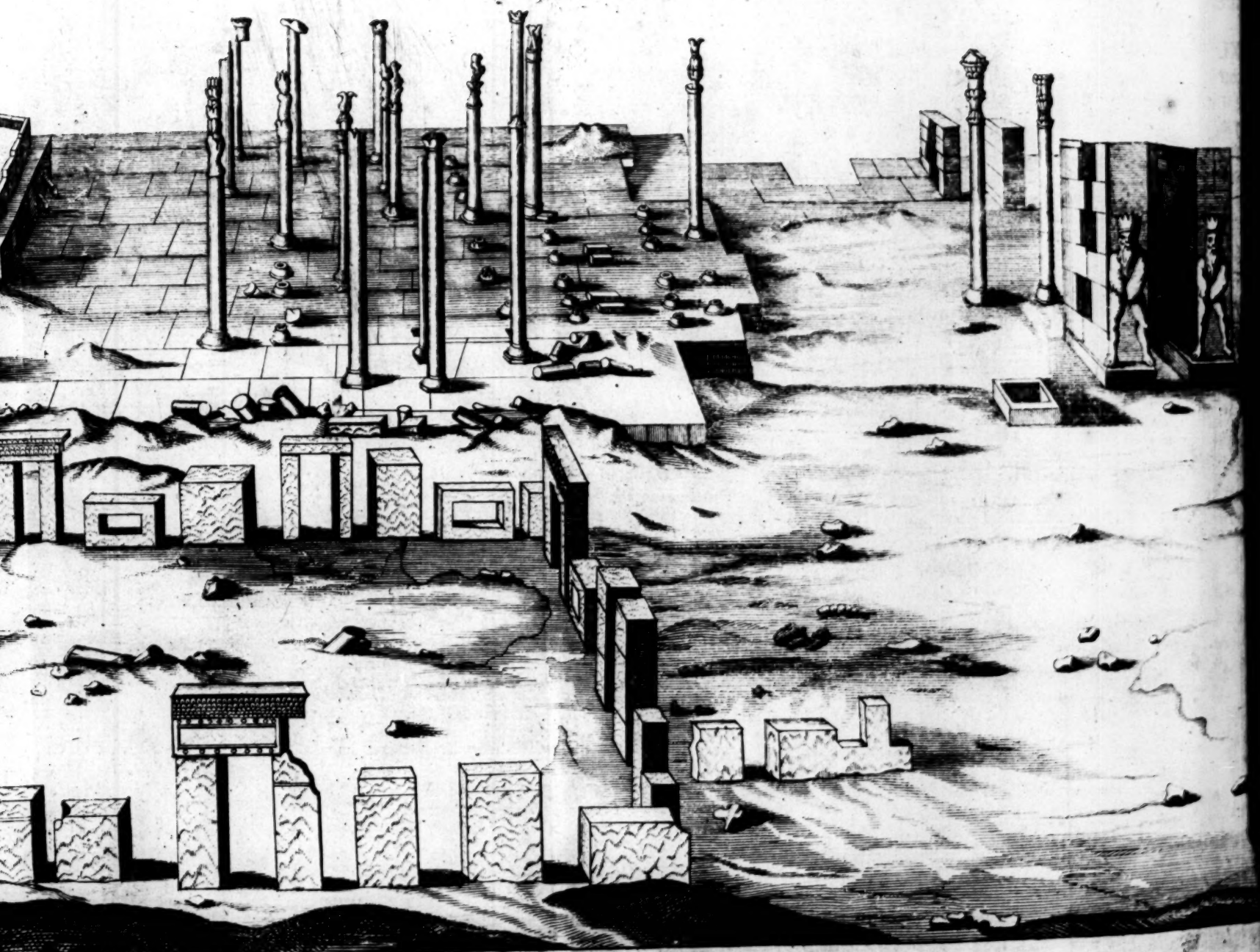


Fig. 62.

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Fig. 72.





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Fig. 71. This *Char after* is likewise engraved at *Persepolis* of like *Antiquity*, with the former. It has some *Affinity* with the *Syriack* and *Arabick*, and has been pretended to be understood by some of the *Padres*.
Mr. F.

2. To the *Inscriptions* found at *Persepolis*, I shall here add the *Draughts* of part of the *Stone-work* of that proud *Palace*, given me by the *Person* himself that drew them upon the *Place*.
The Ruins of *Persepolis*; by M. Nic. Wicet. n. 210.
p. 117.
Fig. 72, 43.

XLIII. I have spent 3 *Months* of 1669, in a *Voyage* to the *Upper Egypt*, accompany'd with my *Brothers*, the *F. Charles* and *Francis*, always ascending upon the *Nile* as high as 300 *Leagues* above *Cairo*, being 2 *Days* Journey on this side of the *Cascade's* of the *Nile*. I there admir'd store of *Idol-Temples* yet entire, together with very ancient *Palaces* fill'd with *Statues* and *Idols*. I counted in one place alone 7 *Obelisks* like those at *Rome*, and above 120 *Columns* in one *Hall*, of the bigness of 5 *Brasses*; full, within and without, from the top to the bottom, with *Hieroglyphick Letters*, and with *Figures* of false *Deities*. I found *Statues* of *White-Marble*; and some of *Black*, of the bigness of 3 *Persons* with a *Sword* on their side, and of an hard *Stone*; namely, a *Man* and a *Woman*, at the least of the height of 8 *Fathoms*, though seated in *Chairs*; but well proportion'd: and two others of *Black-Marble* representing *Women*, with *Globes* on their *Heads* and extravagant *Coverings* thereon, which were two *Foot* Broad from one *Shoulder* to the other.

We lighted not but in two *Places* where *Antiquities* were to be seen; one whereof is call'd *Lozor*, and the other *Candion*, which is a very ancient *Castle*, esteem'd by the *Tradition* of the *Country* to have formerly been the *Residence* of a *King*. Nor indeed is this hard to believe even before one enters into it, considering in the *Avenues* of the said *Castle* a great Number of *Sphinxes* standing in a *Row*, and turning their *Heads* towards the *Alley*. 'Tis known that this is an *Idol* having the *Head* of a *Woman* and the *Body* of a *Lion*, which was once a famous *Diety* among the *Egyptians*. They are distant from each other about 2 *Paces*, and are 20 *Feet* long. I walked in 4 *Alleys* ending at 4 *Gates* of the *Castle*; and for ought I know, there may be more of them, seeing I went but half round the *Castle*, which is very spacious: I reckon'd 60 of them on one side of one *Alley*, and as many over against it; and 51 in another *Alley*; all well measur'd. The *Alleys* are of the Largeness of a *Pall-mall*; the *Gates* of the *Castle* are of an extraordinary *Height* cover'd with most excellent *Stones*. Measuring one, which maketh the *Height* of one of them, I found it 26½ *Foot* long, and proportionably thick. I believe, that there are above a *Million* of *Figures* in *Profile*, none in *Front*: I speak of those that are graven on the *Walls* and *Pillars*. That which most pleas'd me was the *Ground*, where the *Azure* and the other *Colours*, which are like *Enamel*, appear as fresh as if they had been laid on but a *Month* before. There are *Temples* so spacious, that 3000 *People* may stand on the *Roof* with ease. In the same *Castle* there is a *Pond*, the *Water* whereof is bitter, set about with fine *Stones*. This *Water* is said

said perfectly to whiten Linnen all alone; which I try'd not, but we dip'd our Handkerchief in it, which kept the Scent of Soap for 4 or 5 Days.

There are a great Number of *Christian Cophthes* in that Country, who have many *Monasteries* and *ancient Churches*, but poor. We have pass'd many Places, where was neither *Priest* nor *Church*; but only the poor People, like *Sheep* without a *Shepherd*.

An Account
of the Porphyry
Pillars in Egypt
by Dr. Rob. Huntington. n. 261.
p. 624.

XLIV. It may be (I think) taken for granted, that there is no Quarry or rather Rock of *Porphyry* in all the lower parts of *Egypt*: For so far as the *Nile over-flows*, is perfect Soil; and the Boundaries of this *Over-flow* (which are never 10 Miles from the Channel, that I saw, generally scarce $\frac{1}{2}$ of it, and in some Places but a Mile or two, the *Delta*, still excepted, which is Universally cover'd, all but the North-side to the Sea, and a little to the East for some Miles above *Diamata*) are rising Hills of Sand; beyond which is perfect *Desart*, upon the *Africk* side the *Lybian*: [higher South I have been told, there are Rocks nearer the River, and in some places streigthen it: but] Under these Sands, is a yielding Stone, not much harder than *Chalk* tho' not so white, and very easily Manag'd; as at the *Mummies*, deep spacious Vaults which were the old *Repositories* for the Dead. And the like may be also said of those Cells or *Selpulchers* which are hewn purely out of Rocky Earth $\frac{3}{4}$ Mile on the South of *Alexandria*. Albeit nearer the Sea, there are Stones of a harder kind, and with which they Build; but by their Mouldring away, as appears by the Remains of Houses within the Walls of the City, 'tis plain they can't endure the Weather; which is sufficiently corroding there: The Iron which once plated their thick Wooden Gates being mostly eaten away, and the deep Characters, upon the sides of these very *Porphyry Pillars*, exceedingly Defac'd. Indeed about *Memphis*, i. e. by the *Pyramids*, they have a milder Air, and the *Hieroglyphicks* cut in these Stones will last well enough, they shall be remov'd into a *Rougher*: But then they'll Crizle and Scale, as I found by sad Experience. For having procur'd four Stones, the best mark'd with those Figures of Antiquity I could meet with, and sent them down to *Alexandria* in order to their Transportation for *England*; I found them upon my 2d Voyage into *Egypt* very much injur'd, being put into the Custom House yard (where they lie still embargo'd,) by the *Aga*. But yet farther into the Country, there are Mountains of harder Stone: In the *Nitrian*, now the desert of St. *Macarius*, and not far from the Lake where the *Lat-roon* or true *Nitre* incrustates upon the top of the Water, there are many; and some of them not utterly unlike *Porphyry*. That which nearest resembles its Colour, tho' not its Consistence, is the *Vcin* that produces the *Eagle-Stone*; of which there are many in the *Bahr Batama*, a great Sand Velly: But these Stones, are of a different Complexion from *Porphyry*.

However I cannot pronounce that there is no *Porphyry* hereabouts: For in the chief *Monastery* of the 4, now remaining (of 366, as many as are Days in the longest Year) Dedicated to the Blessed *Virgin*; the two Stones which secure their Entrance, are of the like, if not the very same Substance;

like sheep without a shepherd.

[illegible]

Fig. 66. •

חזקת קדושת ה' וזוהי
 חזקת ה' וזוהי חזקת
 חזקת ה' וזוהי חזקת

Fig. 67.

ΤΟΥΤΟ ΠΟCΥΤΟΝ ΜΑCΛΑCΝΟΥ
 ΘΕΟΥΑΡΖΑ CΙΑΩCΒΑCΙΑΕΩΝ
 ΑΡΙΑΝΩΝ CΘCΩΝΥΙΟΥ
 ΘΕΟΥΗΑΝΑ ΥΒΑ . . . ΕΩC

Fig. 69

Fig. 69

بسم الله الرحمن الرحيم
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Fig. 68.

[illegible]

Fig. 70.

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stance; which I more particularly observ'd upon the Account of their Ingenious Contrivance: For the Poor People, lying otherwise at the Mercy of the Roving *Arabs*, with these two *Mill-Stones* (for that's their make) thus make good their *Gate* against them, (or rather their *Passage*) into which they run them, and then drive a great *Wooden Wedge* between them on the *Inside*, which so fastens them that they cannot be loos'd, but upon the *Inside* neither. And of such a sort of *Porphyry* is the noted *Sphinx* (a mighty *Head* and *Shoulders*, 110 *Feet* in compass) yet standing by the *Northern Pyramids*. I have indeed been told of the Place upon *Mount Sinai*, whence this *Porphyry* came: but so they shew the very *Rock* where the two excellent *Double Rows* of *Pillars* in the *Church* of *Bethlehem* were hewn; tho' I went away satisfy'd that 'twas a quite different Sort of *Stone*. Another tells of a *Pillar* of the same Make yet lying there; and if this be certain, you need seek no further: Albeit, I must tell you, that the *Stones* brought thence, with the Representation of a *Beck* (it must needs be call'd) upon them, tho' *Reddish*, are of a much finer, and more even Texture. Father *Carlo Francisco d' Orleans*, now Superior of the *Capucines* at *Cairo*, who went 300 *Leagues* up the *Nile* in the Year 1669, told me of many *Temples*, *Statues*, and *Pillars* at that Distance; tho' I can't be sure he said there were any of *Porphyry*. But since it was in *Thebais*, why may we not suppose them of that *Black*, *White* and *Red* speckled *Thebaick Marble*, famous in the *World*; and wherewith the *Lesser Pyramid*, perhaps was *Crusted*, yet to be seen upon the *Ground* about it, which when polish'd looks finely.

Those which I have my self seen, are one of them at the *Matarea*, 3 or 4 *Miles* East of *Grand Cairo*, and 2 at *Alexandria* just within the *Wall* upon the *Northside* of the *City*: (for *Pompey's Pillar*, as they call it; *1 Mile* without the *Gate* to the *South*, is quite of another Make and Matter:) One of these is thrown down and broken into pieces, but was of the same Dimensions for *Breadth* and *Thicknes* with the other. The *Franks* call them *Agulia's*; the *English* particularly *Cleopatra's Needles*: but the *Inhabitants* content themselves with the general Name of *Pillars*. They have no *Basis* or *Pedestals* above *Ground*; and if they ever had, they must needs be very *Deep* in the *Earth*. The *Stone* it self is something more lively than the *Porphyry* of *St. John's Font* (for by that Name 'tis known) at *Ephesus*; much more vivid than those 4 tall square *Pillars* at *Tadmor* (in its middle Age *Palmyra*) which are each of them but of, I think, One Piece; whilst all the Rest, exceeding many, of another Sort of *Stone* are of several Pieces and *Round*. The *Cleanness* of its *Complexion* may perhaps be attributed in part to the *Air*, which corrodes them especially upon the *North* and *East*. The *Hieroglyphick Character*, with which they are Engraven, is perhaps the *Aboriginal Egyptian Letter*, long since worn out of *Common Use* in the *Country*, as the *Samaritan* (so 'tis now generally call'd,) was amongst the *Jews*, and bears *Proportion*, (with the *China* now in Use) where each *Note* represents a *Word*, or rather an entire *Signification*. And moreover it seems to be wrote the same way from the *Top* to the

Bottom, as may be seen on the Board I brought from a Door in the Village Succara (which is next to the Mummies,) the Largest piece of Egyptian Writing, perhaps, at this Day in Europe. I confess that in the Vaults, or Priest's Chamber cut out of the Rock close by the 2d Pyramid, the whole Walls are Inscrib'd therewith; but I speak of an Original. And if all that is there Written were but exactly Copy'd it might be then lawful to hope, that the Language so long since Dead and Bury'd in the House of Bondage, might have its Resurrection in the Land of Liberty.

That such Vast Monuments might be remov'd from Place to Place, is Difficult indeed, but not impossible: For some of these Mountains are near the Red-Sea; and Sufs from Cairo is but 2 or 3 Days, from the Nile less. How Possible it is to convey mighty Weights by Water, let the Obelisks at Rome declare, which were all of them brought from this very Country; and that such things May be done by Land too, tho' not by every one, is plain enough, because we see they have been done. At Baalbec, which is 14 Hours from Damascus (for thence I went, accompany'd with Mr. Ant. Balam and Mr. Jos. Verney) there is a Stone about 66 Foot Long on the North-side of the Castle Wall, and 2 more of 60 each: And I believe we saw the Way they travell'd, having left one of their Company, tho' not quite so big in the Road, as a Monument there to this very Day.

The Draught of One of the Obelisks was very well taken by Monsieur Brute a French Druggerman: but that of the Other, by a Dutch Painter, is not so well.

Fig. 74. Represents the Obelisks, or Aiguille, near the Matarea: The Height of this Pillar is 67 Foot; the Bigness 7½; with the Hieroglyphick Character, 00, Shews the Height of the Nile's Rising above the Superficies of the Earth, when it Overflows.

Fig. 75. Represents the Needle at Alexandria.

XLV. 1. The Characters being 22 in Number, are all that could be Distinctly Collected out of the Ancient Sculptures, to be found at this Day extant at the Admir'd Hills of Canary; where there are divers Receptacles Cut out of the Main Rock, by the Incredible Industry and Charge of the Ancient Inhabitants of those Parts, supposed Moors or Negroes of Ethiopia rather than Gentues; by reason of the Large Proportion of their Usual Statures, which is at least 8 Foot in Heighth, having Great Lips, Full Eyes, Flat Nose, and Curl'd Hair.

2. It's probable the Intent of this Paper was to Compare these Characters, being very Ancient, with them at Persepolis.

The Places here pointed at, are chiefly 3, Two upon the Island of Salsete, and One upon the Island Pory, call'd the Pagode or Olifant, of such a Bigness that One of them is describ'd by Linschoten, to be Equal to a Village of 400 Houses; to consist of 4 Ranges of Buildings one over another, within the Mountain; and to contain no less than 300 Rooms or Habitations; Adorn'd throughout with strange frightful Statues of Idols, Lyons, Tygers, Elephants, Amazons, and a hundred others Things very well Design'd.

Who

Explanation of
the Figures. Ib.
p. 627. & n. 178.
p. 1252.

Fig. 74.

Fig. 75.

Some Unknown
Ancient Char-
acters, by Mr.
Flower n. 203.
p. 572.

Fig. 76.

Vid. inf. Cap. III.

Remarks; by
Mr. Fran. Aston.
p. 873.
Vid. Sup. Sect.
XLII.

Who were the *Architects* is very uncertain; *Balbi* names the *Romans*, and *Alexander the Great*; others the *Chineses*; *Mr. Flower*, the *Abessins*; who have some few *Churches* cut in the *Rocks*; but *Alvarez*, who saw them Twice, says, The Country affirms they were made by *Egyptians*, or other *White-Men*. But though their Beginning be obscure, their End may more easily be declared: For the *Portugueses* upon the Building of *Goa*, began to destroy them, and have continu'd to do so ever since.

XLVI. *A Paper Omitted, viz.*

A Dissertation of *Dr. Barrow*, De *Sestertio*; Taken out of the 4th Vol. n. 190. p. 384. of his Works.

XLVII. *Accounts of Books, and Emendations, Omitted.*

1. *Institutionum Chronologicarum Libri duo; una cum totidem Arithmetices Chronologica Libellis; per Guilielm. Beveregium. S. Th. D. Lond. 1669. in 4to.* n. 47. p. 956.
2. *Ægidii Strauchii Breviarium Chronologicum. Witebergæ. in 12mo.* n. 50. p. 1022.
3. *Abrege Chronologique de l'Histoire Sacre & Profane; par le P. L'abbé S. J. in 5 Vol. Paris, in 12mo.* lb. p. 1022.
4. *Tabula Mathematico-Historica; à Cl. Megerlino, Matheseos Prof. n. 127. p. 667. Basil.*
5. *Nouvelle Science de Temps: ou Moyen General de Concilier les Chronologues; par le S. Meynard, Seigneur d'Iferné. A Paris, in 12mo.* n. 131. p. 793.
6. *Palæologia Chronica: A Chronological Account of Ancient Time: in 3 Parts; Didactical, Apodeictical, Chronical; By Rob. Cary. D. L. L. Lond. 1677. in Fol.* n. 132. p. 808.
7. *J. Wallisii S. T. D. Exercitatio de Periodo Juliana. Lond. 1678.* n. 139. p. 980.
8. *Quæstio Triplex de Anno, Mense, & Die, Christi Nati, Baptizati & Mortui. Auth. R. P. Michaelis Seneschallô. è S. J. Leodii, 1670 in 4to.* n. 60. p. 1085.
9. *Julius Celsus de Vita & Rebus Gestis Julii Caesaris: Ex Musæo, Joan. Georgii Grevii. Iterata Editio. 1697.* n. 22. p. 327.
10. *The Primitive Origination of Mankind, Consider'd and Examin'd according to the Light of Nature; by Sir Math. Hale. Lond. 1677. in Fol.* n. 136. p. 917.
11. *A Letter of L'Abbé de la Charmoye to L'Abbé Nicaise concerning the Original of Nations. Some Remarks on it; by M. Leibnitz and Dr. Wallis.* n. 255. p. 274. p. 273. 283.
12. *Olavii Rudbekii Atlantica, sive Manheim veri Japeti Posterorum Sedes, ac Patria: ex qua non tantum Monarchæ & Reges, ad totum fere Orbem reliquum regendum ac domandum, Stirpesque suas in eo condendas, sed etiam Scythæ, Barbari, Asæ, Gigantes, Gothi, Phryges, Trojani, Amazones, Thraces, Libyes, Mauri, Tusci, Galli, Cimbri, Cimmerici, Saxones, Germani, Suevi, Longobardi, Vandali, Heruli, Gepidæ, Teutones, Angli, Pictones, Dani, Sicambri, alique virtute clari & celebres Populi, olim Exierunt. Upsal.* p. 1. Col. n. 4. p. n. 255. p. 283.

- n. 62. p. 2032. 13. *De Anglorum Gentis Origine, Disceptatio*; Auth. Robt. Sberinghamo. Cantab. 1670. in 8vo.
- n. 124. p. 396. 14. *Britannia Antiqua Illustrata*: or, The *Antiquities* of ancient Britain, deriv'd from the Phœnicians, &c. Vol. I. By Aylet Sammes. Lond. 1676.
- n. 109. p. 115. 15. The *History* of the Church of Malabar, from the Time of its being discover'd by the Portuguese in the Year 1501. Giving an Account of the Persecutions and violent Methods of the Roman Prelates to reduce them to the Subjection of the Church of Rome: Together with the Synod of Diamper, Celebrated An. 1599. With some Remarks upon the Faith and Doctrine of the Christians of St. Thomas in the Indies, Agreeing with the Church of England, in Opposition to that of Rome. Done out of Portuguese into English; by Mich. Geddes, Chancellor of the Cathedral Church of Sarum. Lond. 1694. in 8vo.
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- n. 153. p. 386. 17. *Recherches Curieuses, &c.* Curious Researches of Antiquity, Contain'd in divers Dissertations concerning Medals, Base-Reliefs, Statues, Mosaick-Works, and Inscriptions of the Ancients; by Dr. Spon. 1683. in 4to.
- n. 260. p. 467. 18. *Linguarum Vett. Septentrionalium Thesaurus Grammatico-Criticus & Archaeologicus*. Accedit Catalogus Librorum Veterum Septentrionalium, tam eorum qui Excusi sunt, quàm qui in Membranis Scriptis nondum Eduntur, quàm fieri licuit, Locupletissimus. Auth. G. Hicks. S. Th. D. Oxon. in Fol.
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- n. 220. p. 259. 20. *Parochial Antiquities*, attempted in the History of Ambrosden, Burcester, and other adjacent Parts, in the Counties of Oxford and Bucks; by White Kennet. Oxon. 1695. in 4to.
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Fig. 75.



Fig. 78.



Fig. 80.

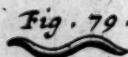


Fig. 79.



Fig. 83.



Fig. 74.

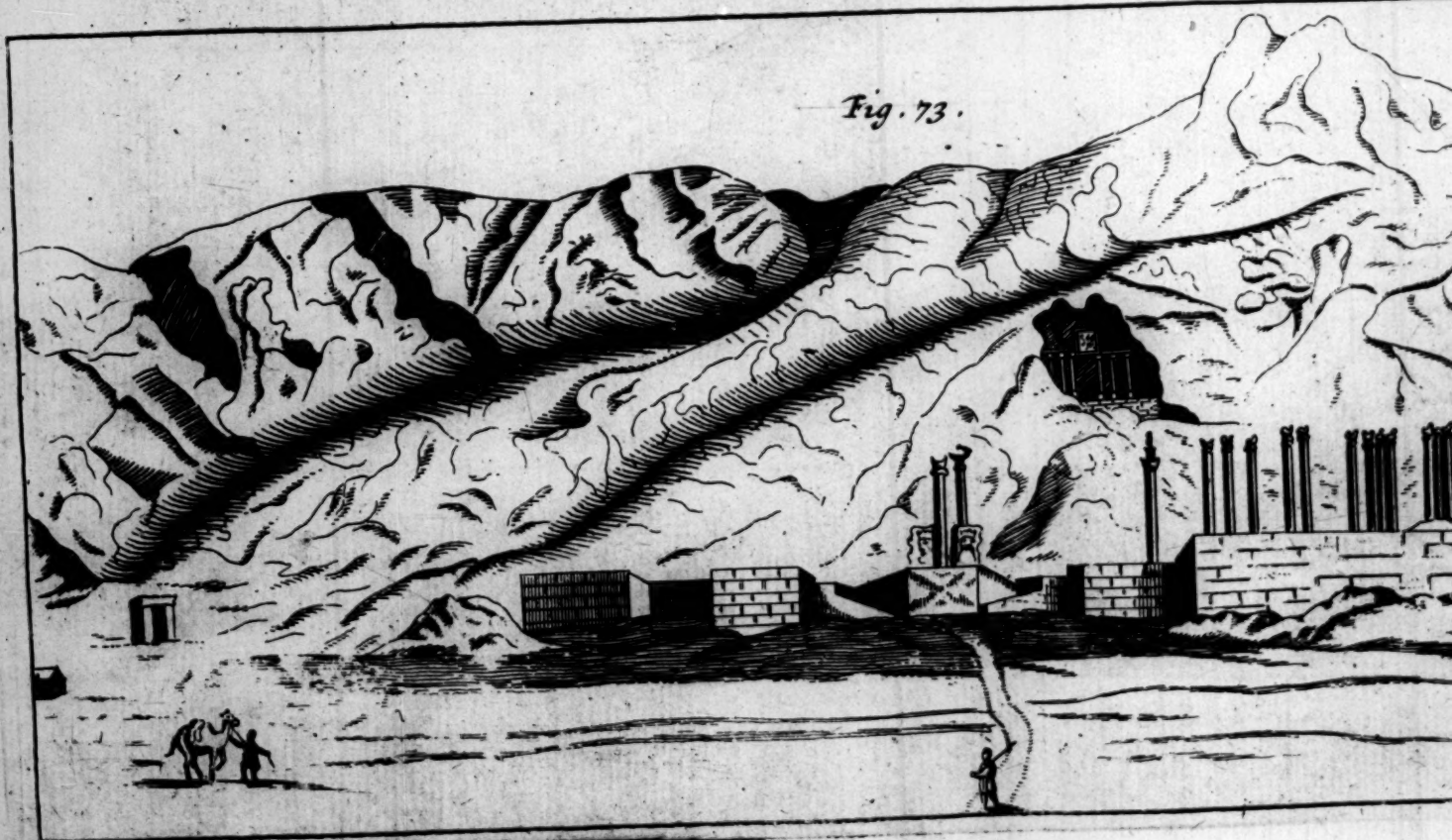


Fig. 73.

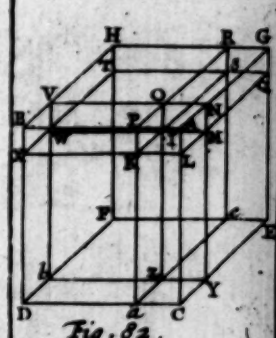
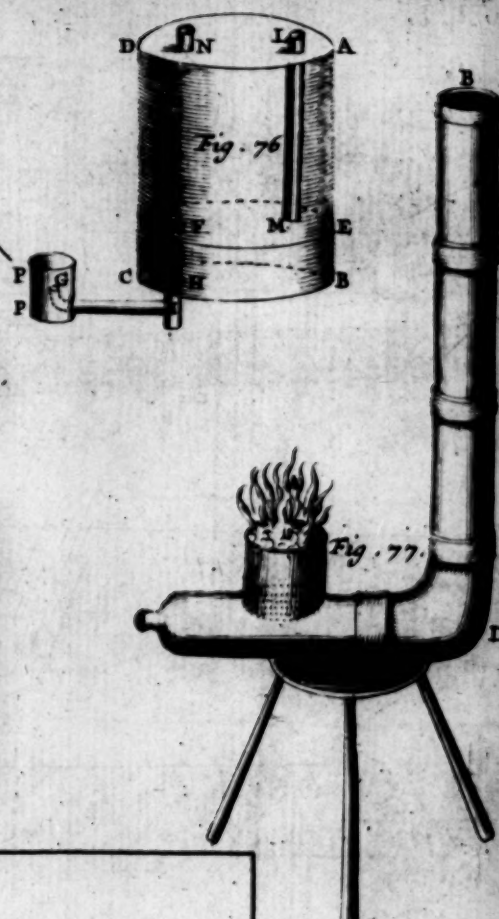
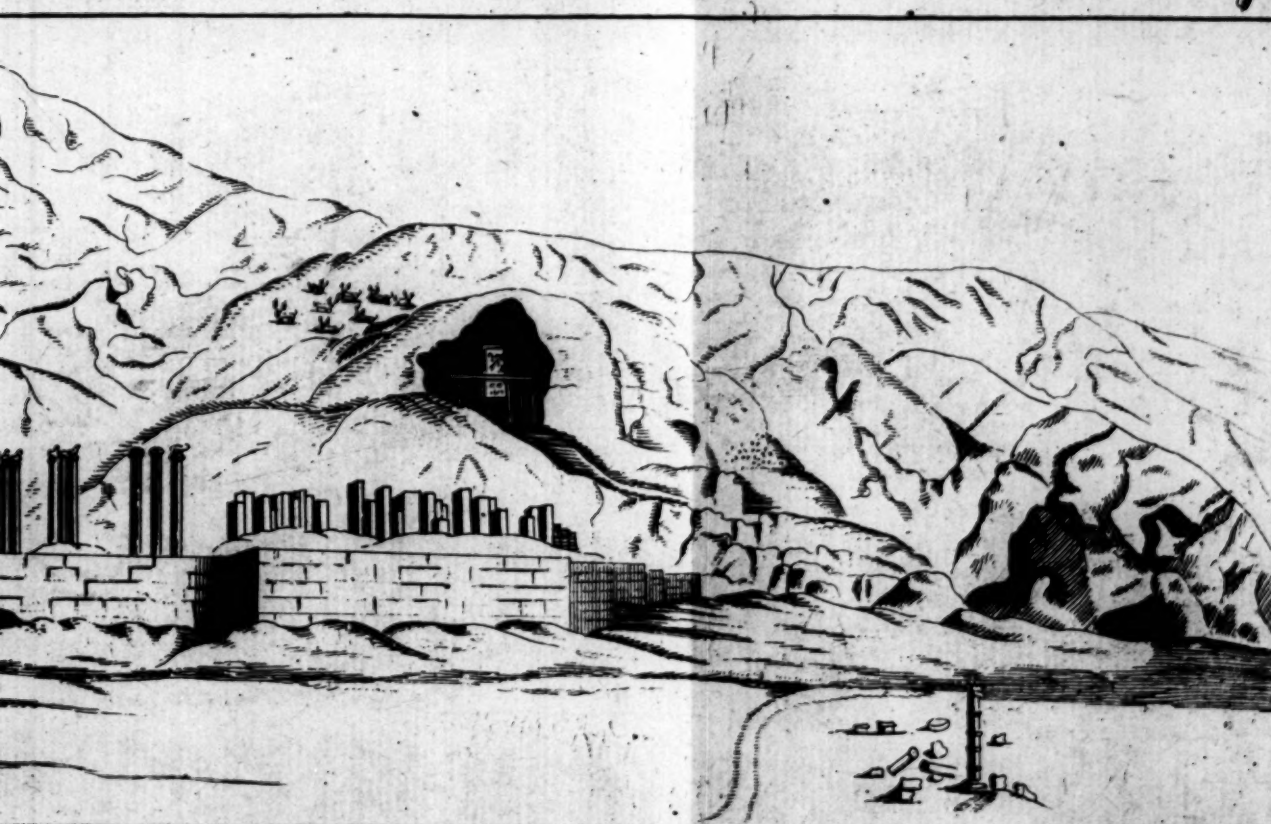
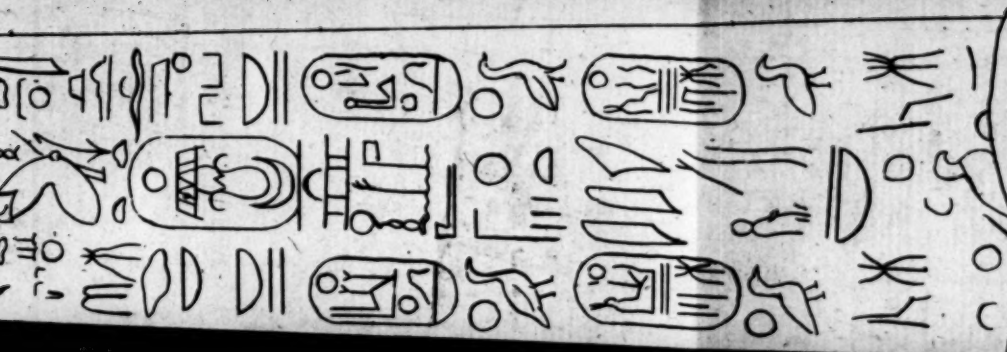
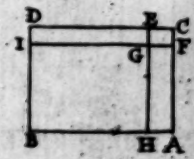
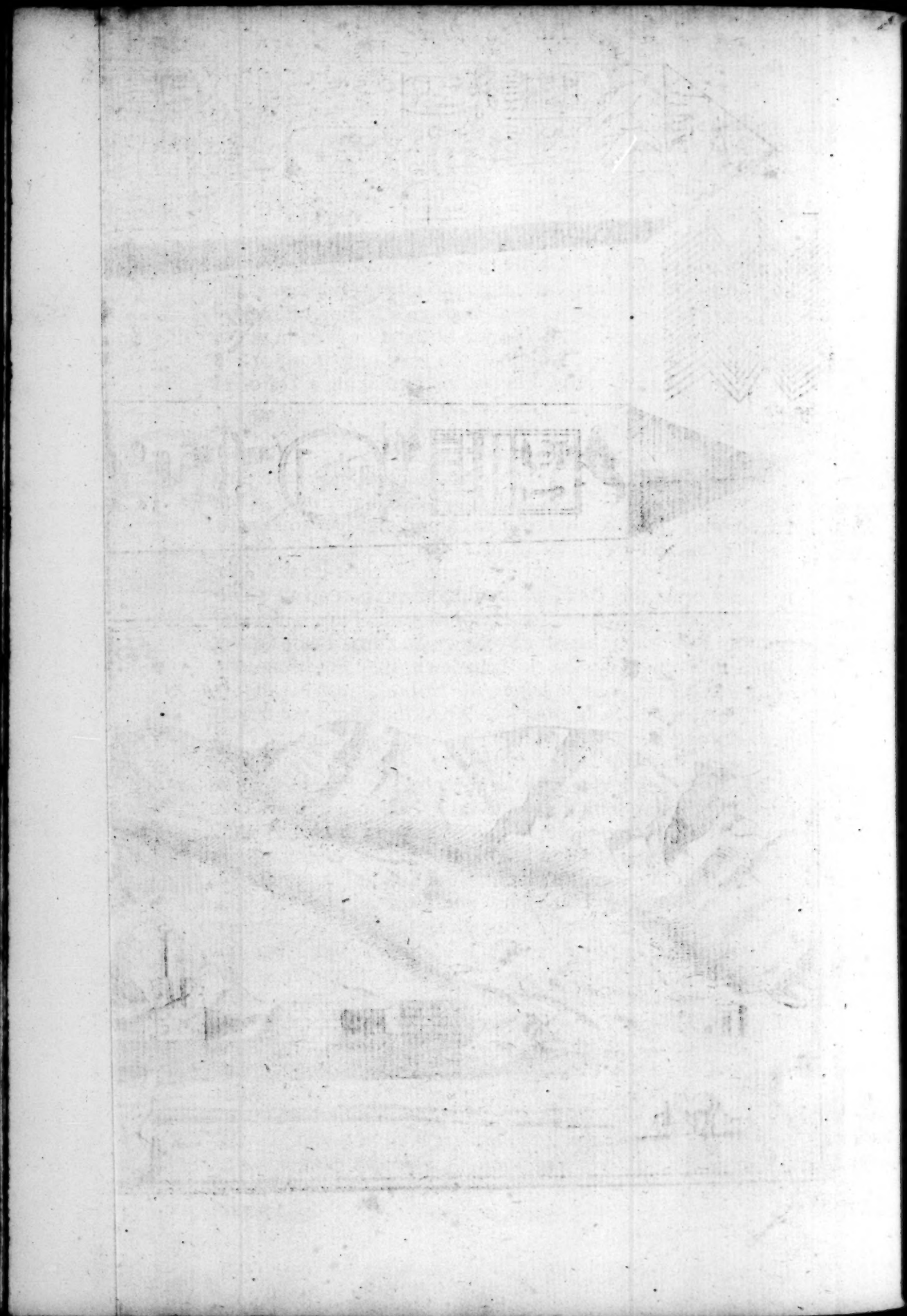


Fig. 81.





C H A P. III.

Voyages and Travels.

I. **T**hat part of the County of *Lincoln* that lyeth towards the Sea, is a Level about 50 Miles long, viz. from *Grimsby* to *Crow-land*; and Broad from the Sea to the *Wolds* (or *High-lands*) 10. It may be divided first into *Marshes* extending from *Grimsby* to about *Wainfleet*, in which are a great Stock of large *Sheep*, which yield a very lusty *Wool*, or of a large *Staple* (as here phrased) 3, or 4 *Fleeces* usually making a *Tod* of 28 Pound. Several Hundred Loads are yearly carry'd out of it into *North-folk*, *Suffolk*, the *North*, and *West-Countries* in great Packs (call'd *Pockets*) of about 2500 l. Weight, and there manufactur'd.

Several Observa-
bles in *Lincoln-
shire*; by Mr.
Ch. Merret. n.
223. p. 343.

2. *Fens*, the *East*, begins about *Wainfleet*, and ends at *Sibsey*, yielding a great plenty and variety of *Fowl* and *Fish*, particularly *Duck*, *Mallard*, and *Teal*, which are usually taken in *Decoys*, and sent to *London*. The *Decoy-Men* contract for them all at a certain Rate per Dozen, which the Carriers (*Kedgers*) are oblig'd to take off their Hand: Two *Teal* are reckon'd equal to a *Duck*, which usually cost here about 9 Shillings a Dozen. About *Midsummer* (when *Moultering Time* is) several Persons, some for Pleasure, others for Profit, go in small Boats among the Reeds, and with long Poles knock them down, they not being able to swim or fly from them. A little before *Michaelmas*, great Flights arrive in these Parts, which soon grow fat. When the *Decoys* are frozen (which they keep open as long as possible, by breaking them) the *Fowl* resort to the Sea for their Food. As for *Fish*, there are great Quantities, especially *Pike*, some being of a very large Size. The *Fens* abound no less with *Quadrupeds*, as *Beasts*, *Sheep* especially (which will grow fat) and *Horses*. These *Fens* are common, so that each Town hath a distinct Brand, and also each Man: There are several *Fen-Riders*, which look after them. The *Cattle*, when used some small time in a piece of Ground, seldom leave it; so that each individual Person, may easily find his own Goods in such a large Tract. Through these *Fens* run great Cuts or *Dreins*, in which are a great many *Fish*. There are also vast Numbers of *Geese* which live on the Grass, but both taste rank and muddy; but they yield vast Quantities of *Feathers* and *Quills*; there having been 300 Bags, each weighing one Hundred and a Half; exported from *Boston* in one Year. The Owners pull them 4, 5, nay, some 6 times a Year for their *Feathers*, and thrice for their *Quills*; each Pulling comes to two Pence. Some Persons have 1000, and some more; they are kept at little or no Charge, except in deep snowy Weather, when they feed them with Corn. Between *Spalding* and *Crowland* grow very great Crops of *Oats* and also large Quantities of *Rapum Sylv.* (call'd *Cole-Seed*) where- of they make *Oyl*, by breaking it between two great *Black-Marble* Stones.

Stones of near a *Tun* Weight, one standing *perpendicularly* on the other (they come out of *Germany*) in *Mills*, call'd *Oyl-Mills*; some go with *Sails*, and serve also to *Drein* the *Fens*, and are call'd *Engins*; being of good Use, and discharge great Quantities of *Water*.

These *Fens* lying low, being of great extent and receiving vast Quantities of *Water* from the high Country, makes them subject to *Over-flowing*; and although there be great Cost and Skill used to keep them dry, yet they are sometimes like a *Sea*; *Sheep* have been brought out in *Boats*, and the *Inhabitants* supply'd in their upper Rooms with Provisions by them. To *drein* them there are great *Cuts* of 20, 30, and 40 *Foot* wide, running through them; most of them made by a Body of Men call'd *Undertakers*. They also made very large *Sluices*; but the Country has since dammed up their *Sluices*, and built new ones (call'd *Goats* and *Clows*). Some cost near 2000*l*. And although made with great Skill and Strength, yet are they subject to be blown up by the vast Quantities and Force of *Water* that lieth upon them, (especially when *Over-flown*). Some have 2 or more pair of *Doors*, of 6, 8, or 10 *Foot* high, which shut when the *Water* in the *River* is higher than in the *Dreins*: and *è contra*, running sometimes a Body of 8 *Foot* Square, for about 6 or 7 *Hours*, during the *Ebb*.

3. *Pasture Grounds*, lying between the *Sea* and these *Fens*; they are very fertile, feeding a great Number of fat *Oxen* and *Sheep*, which weekly are sent to *London* in *Droves*. Their *Wool* both as to Plenty and Goodness, much like to that of the *Marshes*. *Tallow* here is in good Plenty, which supplieth *London* and other Places. Here each Town hath an *Outfall* by *Dreins*, and *Goats* to keep them dry.

Near unto the *Fens* stands *Boston*, now not so remarkable for *Trade*: but for the *Church*, *Steeple* and *River* may compare (probably) with any private *Parish* in *England*. The *Church* looks like a beautiful *Princess* among a Company of fair *Ladies*, no Country yielding fairer *Churches*; and what is more observable, not a *Stone* fit for Building in all this *Tract*. The *Church* is very lofty, and ciell'd with *Irish-Oak*, neatly wrought; the Body is 100 *Foot* wide; the *Steeple* is a *Tower* of 285 *Foot* high, *Octangular* towards the Top; of curious *Stone Carv'd-Work*, standing not above 12 *Tards* from the *River Witham*; 'tis but 32 *Foot* wide, and but 40 long. At each *Angle* is a large *Butteress*; the *Stones* of the Sides between them, are but 7 *Inches* thick, so that this stately curious Building seems to be supported by them; it much resembles *St. Mary's* at *Antwerp* (only wanting the hollow *Crown-Work* and *Weather-Cock* on the top of all) of which the *Inhabitants* report *Charles V.* the *Emperor*, should say, That it ought to have a *Cafe*, and only be shewn on *Holy-Days*. Records mention the *Foundation* to be laid 9 *Foot* below the Bottom of the *River*. The Length of the *Church* is equal to the *Steeple's* Height. The *Pillars* (which are very neat and small for their Height) *Windows* and *Stairs* are equal to the *Months*, *Weeks* and *Days* in a Year: From the Top of it *Lincoln* and *Lyn* may be seen, as also *Ships* sailing in the *Seas* at a great Distance; 'tis a great *Land-Mark*, and may be seen
above

above 40 Miles at Sea. The River is remarkable for good Pike, according to the Old Rhime,

*An Ankham Eel, and a Witham Pike,
All England cannot shew the like.*

As also for the Rapidness of its Stream. Of late there are *Eagers*, sometimes endangering Shipping, without great Care, which much destroy its Banks and Keys, though fortify'd with great Piles and *Fetties*, &c So that neither Town nor Country, can scarcely keep it within its Banks, it often breaking and over-topping them: which in time is like to ruin the Town except assisted by *Parliament*, or by taking in of the *Fen*, which might make it flourish again, it being as rich in Soil as any Ground probably in *England*. But what is most Remarkable, some *Tears* 40, 50, or 100 *Tun* of Oyl hath been made of a Small Fish, call'd in Latin *Pungitius*, here *Stickle-back*, elsewhere *Prickling* or *Banstead*, having small *Prickles* on its Back, whence most of its Names, thereby scaring the Fish out of our River, especially *Smelts*, of which we have good Plenty and Large. They are not above an *Inch* and *half* long, and about half as broad, taken in this River above the Town, for about 5 or 6 Miles; about a *Bushel* are taken at a Draught, and about 8 *Chalder* will make a *Hoghead*. They boil by Night what were taken by Day, else the Oyl will run of it self, and so waste.

The Sea looseth and gaineth considerably in this County: for about *Holbeach*, *Sutton* and *Wainfleet*, great *Marshes* have been lately taken in, but *Northward* of *Ingold-Meals*, it hath Lost much more. I have seen the *Roots of Trees*, that have been Dug out of the *Sands* at *Low-water*, near a *Mile* from the *Shore*, which I take to belong to *Fir*, the Bark Smelling Aromatically, and somewhat like that of *Fir-Timber* in Piles that have been long in Salt Water, but not near so strong; and at *Mawplethrop*, they are often in Danger of being Drowned, their Defence being only *Banks*, or Hills of a Small Sand, call'd *Meals*, the Former *Church* having been devour'd by it.

What is further observable among *Animals*, is, first of *Quadrupeds*, the Country People gather up the *Dung* of *Oxen* and *Cows*, which they temper with Water, and spread it on the Ground about 5 *Inches* thick, and cut it out in oblong pieces of about a *Foot*, and call them *Dithes* which they use for *Fewel*. I have been credibly informed, that one Person's Inventory of them came to 400 *l*. They also gather up *Hog's-Dung* and steep it in Water, and having well stir'd it, strein it, and so use to *Wash* Cloaths, which when *Bleached* in the Summer, will become White and Sweet.

Besides *Fowl* mention'd by Mr. *Cambden*, of *Mud-Suckers* (which are esteem'd the best) we have *Ruff* and *Reve*, the former being the *Cock*, the other the *Hen*; in Latin, *Aves Pugnaces*, because you shall seldom look on them but they are *Fighting*, among a 100, rarely two are of a Colour;

Colour; they are usually *Mewed*; they are Scarce and Dear, usually bespoke by Persons of Quality. Here are also, almost through the whole *Level*, *Swans* in their *Dreins*, which they often Feed for Presents with *Oats*, each requiring Two *Strike*, i. e. 16 Gallons, here reputed but a *Bushel*.

For *Fish*, here are *Turbets* in good plenty (here call'd *Brets*) taken in *Nets* trail'd on the Ground by two Horses; one goeth Mid-rib Deep into the Sea, the other near the Shore. Here are also good plenty of Large *Soals*, taken in *Troul-Nets*, the *Smacks* being under Sail trailing them along; as also good Store of *Scate*, which are taken by *Hooks* lying near the Shores; as are also *Cod* and *Thornback*.

Amongst *Insects*, *Gants*, here *Midges*, are in some places very Troublesome; some have *Nets* made of *Silk*, to secure them from being Bitten. *Frogs* here are in great Plenty, call'd *Holland Waites*.

As for *Vegetables*, great Quantities of *Hemp* are Sown in several places, of which *Ropes* are both made for Sea and Land; the *Female* is call'd *Femle*, as also *Flax*: The *Seed* is broken, and *Oyl* made thereof, as of *Cole-Seed*. Our *Salt Marshes* yield a great deal of *Kali Geniculatum*, which when Pickled is their *Samphire*, and very plentifully used, and far esteem'd by them before *Crithmum Marinum*. *Carum* grows plentifully in our *Pastures*; the *Seed* they call *Saxifrage*, which they gather and send to London. *Myrtus Brabantica*, call'd *Gall*, is used in some places to garnish their Chimneys. *Kirton Pippins* here are good, and in very good plenty. More rare *Plants* are *Rhamnus Salicis Fol. Fructu Flavescente* C. B. *Limonium*. *Scordium*, *Petasites*, *Lilium conval.* *Eryngium*, *Althæa*, in great plenty, *Sambucus vulg.* *Baccis in Umbellis*, *Militaris Azoides*.

These Parts afford but little variety of *Metals*, *Gums*, or *Stones*. *Amber* is pickt up sometimes on the *Sands* in pretty big pieces; I have had one weighing near 6 Ounces. The *Astroites*, found at *Belvoir Castle*, will not only *stir* in *Vinegar*, but also *Dulcify* it: the like will those do, as also *Lapis Judaicus* first found in *England*, by my Kinsman, Mr. Robert Jenner, Rector of *Lyddiard Milliscent Wilts*, in a Park belonging to Sir *Walter St. John*, near unto him.

Here *Coals* are charred and then call'd *Coak*, wherewith they Dry *Malt*, giving little *Colour* or *Taste* to the Drink made therewith. On the *Sands* the poor People sweep together a black *Small Substance* (I suppose 'tis *Coals* broken) wherewith they make *Fires*, by leaving open a *Hole* in their *Chimneys*, for the Air to Blow it; they have One on both side to open and shut as the *Wind* sits.

What I have further to observe is, That *Agues* (here call'd *Holland Bay-lies*) are very Rife; few Strangers escaping without a *Seasoning*. As also, That at *Spalding* there is lately a vast *Tunnel*, laid under the River *Welland*, carrying another under it, for *Dreining* the *Fens*. And That between *Dunnington* and *Brigg-End*, which is about 3 Miles, a good *Cause-way* is carry'd through the *Fen*, having in several places *Bridges* for the *Water* to run under them, whence the Name of *Brigg-End Cause-way*:
Tis

'Tis after great Rain under Water, and Passengers take Guides, the Bridges directing them. It was built at the Country's Charge, who also purchased near 100 Pounds per Annum to maintain it; now under the Care of the Family of the Shuttlewoods. 'Tis farther observable, That there is a great many Hills thrown up call'd Burrows, mention'd by Sir Tho. Brown in his *Miscellaneous Tracts*, suppos'd to be Sepulchral Monuments.

Some Years great Quantities of *Acus Major* come into our Haven: and they say the fresh Water blinds them, and that they portend hard Winters. They run their Beaks into our *Ousy Shore*; where the Tide leaves them, and are so taken up in great Quantities: they are said to eat like *Mackarel*; The palate is ruled by the Eye, they looking like them. Our *Fen Geese*, when taken up and fed with Corn become as good as others. After pressing out the Oyl from the *Cole-Seed*, the remainder is call'd *Cakes*, which here they heat *Ovens* with, and burn for *Fewel* (but some smell strong): we export them to *Holland*, where they feed their *Kine* with them.

II. The Stone at *Chester*, which is soft reddish Grit, and very friable, with shining Particles intermixt, is very apt to decay with the Weather: So that all old Buildings are very much defac'd thereby, and the Walls which are built thereof, are so frequently out of repair, that they have Officers on purpose, whom they call *Murengers*, who do gradually re-fit them, where they are most worn out. In some places the Stone is in a manner mouldred away like *Sammel Bricks* in a Wall, leaving the *Mortar* standing. In these Stones, and the *Quarries* from whence they come, I have diligently sought for *Shells*, or other *Animal Substances*, such as are often found in other Places, but hitherto have found no such Things: But the Stone is generally interspers'd with *Pebbles* and small *Flints*, which as the Stone decays, do discover themselves within it, as if they had been lodged in the *Sands*, whereof the Stone consists, before its *Induration*.

*Observations on
Chester; by Mr.
Edmund Halley.
n. 222, p. 318*

III. From the Top of *Snowdown-Hill* the Sea dipt every where above a Degree below us, the *Visible Horizon* being a lesser Circle. We saw *Ireland* plainly, from the W. b. S. to S.W. b.W. and *Man* appearing in the N.N.W. and the Mountains of *Cumberland* or *Westmorland* very faintly, but evidently in the North; and I think we saw as far as *St. David's Head* into the South; *Carnarvanshire* and *Anglesey* lay under like a Map, affording a very pleasant Prospect, were it not for the Horrors of the Neighbouring *Precipices*: Hence we counted 15 or 16 *Lakes*, great and small, where the Cavities of the Rocks are fill'd up with the *Rills* that gleet from the Hills: all these are said to abound with *Trouts*, some of which we found to be special good Fish. And in one of the *Lakes* I was on Board a floating Island, as it may be call'd: the Lake is scarce half a Mile about, environ'd with a boggy turfy Soil, a Piece of which, about 6 Yards long and 4 broad, floats on the Water, being about 5 or 6 Inches rais'd above it; but it is, I believe, about 18 Inches deep within the the Water, having

*An Account of
Snowdown-Hill
by Mr. Edmund
Halley. n. 229.
p. 566.*

Broad spreading fungous Roots on it sides, the lightness of which buoys it up. It was driven on the *Lee Shore*: But I lanch'd it off and swam it, to be satisfy'd it floated. This I take the more notice of, because it is deny'd to be true, by the Author of the *Additions to Cambden*, lately publish'd; but I my self saw it as describ'd, and was told it had formerly been bigger; there being a lesser Spot, that they told us, had been heretofore a Part thereof, which floated likewise.

A little above *Llanberris* which stands at the *Foot* of the Hill, are the principal *Fountains* of the *River* that falls into the *Channel* of *Anglesey*, at *Carnarvan*, call'd anciently *Segontium*.

*Observations in
Scotland, by Mr.
J. A. Fraser, n. 254
p. 231.*

IV. Upon the North-side of *Loch-Nefs* in *Scotland*, stands the famous *Castle* of *Urquhart* upon a *Rock*: The great *Ditch* round it was, for the most Part, cut out of the *Rock*, and receiv'd the *Water* of the *Lake*. This *Castle* consisted of seven great *Towers*, and it's said, was built by the *Cummins*: but had its *Overthrow* by *King Edward the First* of *England*: And nothing remains now, but one *Tower* to the *East*.

There is, due *West* from the end of the *River* of *Nefs*, an *Arm* of the *Sea* call'd *Beaulic Frith*, 6 *Miles* in *Length* and 2 in *Breadth*. This *Bottom* sure has been *firm Land* of *Old*: For near the middle of it we find long *Oaken Trees*, with their whole *Roots*, some above 60 *Foot* in *Length*, lying cover'd with *Sand*, which no doubt, have grown there, and lie flat as they fell. For further *Information*, there are three great *Heaps* of *Stones* in this *Lake*, at considerable distance one from the other: These we call *Cairns* in the *Irish*. One of a huge *Bigness*, (in the middle of the *Frith*) at *Low-Water*, is accessible: And we find it has been a *Burial Place* by the *Urns* which are sometimes discover'd. As the *Sea* encroaches and wears the *Banks* upward, there are long *Oaken Beams* of 20 or 30 *Foot* long found: Some of these 8, some 12, or 14 *Feet* under *Ground*. I saw one of them 14 *Foot* long, that carry'd the *Mark* of the *Ax* on it, and had several *Wimble-bores* in it. The *River* of *Beuly*, which falls into this *Arm* of the *Sea* near *Lovat*, hath so sunk, that *Oaken Trees* of incredible length, and 16 *Foot* under *Gound*, are discover'd in the *Banks*, with *Degrees* of *Sand*, *Gravel*, *Clay*, and *Earth* above them: And if you remember, when we went to *Beuly*, we found some *Oaks* with *Coals* and *Pieces* of *burnt Timber*, as low as 16 *Foot*, or thereabouts.

On the *Top* of a *Mountain* call'd *Scure-in Lappich*, there is a vast *Heap* of *White Stones* like *Chrystal*, each of them bigger than a *Man* can heave: they will strike *Fire* like a *Flint*, and have the *Smell* of *Sea-wrack*. Upon this *Mountain* is found also *Oyster Shells* in plenty, *Scallop* and *Limpet Shells*, yet 20 *Miles* from any *Sea*. Round about this *Hill* grows the *Sea-pink*, in *Irish*, *Teartag*: It has the *Taste* and *Colour* of that which grows on our *Sea-Banks*.

The *Pagan Temples*, or *High-Places* of *Idolatry*, are still very numerous here: Upon the *River* side of *Narden*, I reckon'd 13 in 2 *Miles*. They are *Orbicular* round, and at the *West-End* two high *Stones* like *Pyramids*: there

there is an outward and inward Circle of lesser Stones, and a round *Mote* in the Center for *Sacrifice*. Another Sort of them are only of *Earth*, and a *Trench* round about, and a *Mote* in the middle. In many of these I find a round *Heap* of *Stones*, and *Urns* in them: It seems a different *Religion* afterwards turn'd these *Places* of *Worship* into *Burial-Places*.

V. In *Scotland* one of the most ordinary *Soils* for *Barley-land*, is in *Earth* digg'd and mix'd with *Beasts-Dung*: In a place near my Dwelling there is a *Plat* of *Ground*, less than an *Acre*, out of which for these many *Years* past, *Earth* hath been digg'd for the said Use; and in *Two Years* time it will grow up again, and fill the excavated Place, so that it continually furnishes *Soil* for the adjacent *Lands*. Another I have in a *Farm* belonging to my self, 20 *Miles* distant from this, of the same Nature and Quality. Both are a stiff clayish *Earth*, of a dark Colour and moist: It will grow a *Foot* high in 2 *Years*. Nothing makes our *Land* give better Increase of *Barley* than *Sea-Wrack* (*Alga Marina*): but *Lands* often used to this *Manure* yield but bad *Oats*, and small Quantity, and the *Husks* both of *Barley* and *Oats*, that grow on such *Lands*, are thicker than those that grow on other *Lands*; and these *Grains* have also greater Mixture of *Darnel*.

Observations in
Scotland; by Sir
Geo. Mackenzie.
i. 117. p. 396.

The Increase that some *Places* in our *Isles* do yield is almost incredible, considering the *Climate* and *Soil*. For some will ordinarily yield 16 or Eighteen-fold; as very honest and credible *Farmers* have often inform'd me, from their continual Experience: And most of those *Lands* that yield so well, are of a very sandy *Soil*, and only manured with *Sea-Wrack*. I have a Piece of *Land* in *Lothbroom Parish*, that yields every *Year* plentiful Crops of *Barley*, without ever having so much as one Load of *Manure*, or any kind of *Addition*, laid on it: And this it hath done past Memory. I have seen *Corn* of it several *Years*; nor doth the *Ground* grow less, nor is it exhausted, by yielding such Plenty of *Corn* and *Straw*, though it receives no *Addition*.

There are also some *Fields*, that appear to be nothing else but a gathering of small *Pebbles*, insomuch that *Earth* cannot well be discern'd amongst them; yet do they yield abundance of good *Corn*, especially of *Barley*; and more than contiguous *Lands* that are not stony.

As for our *Herbs*, I have nothing extraordinary; all I find here, are in *History*, excepting one, which grows on stony *Shores*. When the *Highlanders* want *Ink*, they take the *Root* of the *Iris Palustris Lutea* (*Yellow Water-Flower-de-luce*) and infuse it 24 *Hours* in clear *Fountain Water*; others boil it a little; the *Water* will not be ting'd to any Height. Then they take a rough white *Pebble*, and rub it continually in the *Water* on a *Knife* or any piece of clean *Steel*; and in less than an *Hour's* time, the *Water* will become very black, and tolerable good *Ink*.

Our *Forresters* alledge, that when *Deer* are wounded, they lie on a certain *Herb*, which grows plentifully in our *Forrests*; and that by its Virtue the *Bleeding* is stanch'd, and the *Wound* healed. I did take a Quantity

of it, and reduc'd it to a *Salve*, with *Wax* and *Butter*; its Effect was, that it *heal'd* too suddenly. So that I durst not adventure to use it in any deep *Wound*; but for superficial *Scars*, it hath a very sudden Operation. I find this *Herb* to be *Asphodelus Lancastria Verus* of *Johnston*; or the *Lancashire Asphodill*.

I cannot omit to add here, that 'tis very ordinary to find *Molucca Beans* on the Shore of the *Lewes* or other our *Western Isles*. They are found fast to the *Stalks*, which the common People suppos'd to be *Sea-Tangles*, and laughed at me, when I said they were *Land-Beans*: Which made me write to the Earl of *Seaforth*, whilst he liv'd in the *Lewes*, that I suppos'd, these apparent *Tangles* were the *Ham* of the *Beans*, which by long lying in the *Sea* might acquire that likeness: His Lordship examin'd the Matter, and found it so. And he likewise sent to me a piece of a *Cabbage-Tree*, that was found on that Shore. It is observable that the *Kernel* of these *Nuts* will be *fresh* and *sound*; and the People make *Boxes* for *Snuff* of the *Bean Husk*. Now, considering the Situation of these *Isles* with respect to any Place where the *Molucca Beans* grow, let the Observers of *Tides* consider, what Reciprocations must be imagin'd to adjust the *Eastern* and *Western constant Currents* of the *Main*, with the waiting of these *Beans* on Places that lie so far out of the *Road* of any of the *direct Tides*. And if they grow only about the *Molucca Isles*, or on no Place on this side the *Equator*, it would seem more probable, that they came by the *Northern Passage*, than any other way. And their *Freshness* in the *Kernel* seems rather to have been kept in a cold *Conservatory*, than in the warm Baths of the other Progress.

Strange Beans
frequently cast a-
shore on the Ork-
ney's; by Dr. H.
Sloan. p. 222. p.
298.

VI. I have several Times heard of *strange Beans* thrown up by the *Sea* on the *Islands*, on the *North West* Parts of *Scotland*, especially those of them, which are most expos'd to the *Waves* of the *Great Ocean*; they are thrown up pretty frequently in great Numbers, and are no otherwise regarded than as they serve to make *Snuff-Boxes*. Dr. Geo. Garden hath lately sent me 4 *Sorts* of them very fresh, and little injur'd by the *Sea*.

The *first* is what is call'd at *Jamaica* commonly *Cocoons*; by me, *Phaseolus Maximus Perennis*, Folio decomposito Lobo maximo contorto. It grows in both the hot *East* and *West-Indies*. This, I am told, is also cast up on the *Coast* of *Kerry* in *Ireland*.

The *second Sort* is what, in *Jamaica*, we call commonly the *Horse Eye-Bean*, from its Resemblance to the *Eye* of that *Beast*, by means of a *Hilus*, or *Welt*, almost surrounding it. This likewise is common to the hot Parts of the *East* and *West-Indies*.

The *third Kind* is that which in *Jamaica* is call'd *Ash coloured Nickar*, from its being perfectly round and very like a *Nickar*, such as Boys use to play withal. This is likewise common to the hot Parts of the *East* and *West-Indies*.

The *fourth Sort* of these *Beans* I never saw grow, but I have seen several of them in *Collections of rare Fruits*. It is the *Fructus Exot. Orbicularis Sulcis*

Sulcis Nervisque distinctus 4. seu Fructus alter Splendens 4. Sulcis distinctus : C. B. Where it grows Authors are silent.

It is easy to conceive that the *Beans* growing in *Jamaica* in the Woods may fall from the Trees into the *Rivers*, and be convey'd by them into the Sea; it is likewise easy to believe, that being got to Sea, and floating in it in the Neighbourhood of that *Island*, they may be carry'd from thence by the *Wind* and *Current* which is there constantly *East*, and which meeting with a Stop on the main Continent of *America* is forced through the *Gulf* of *Florida*, or *Canal* of *Bahama*, into the *N. American Sea*, for the *Lenticula Marina Serratis Foliis*, *Lob.* or *Sargasso*, grows on the Rocks about *Jamaica*, and is carry'd by the *Winds* and *Current* (which for the most part go impetuously the same way) towards the Coast of *Florida*, and thence into the *Northern American Ocean*, where it lies very thick on the Surface of the Seas. But how they should come the rest of their *Voyage* I cannot tell, unless it be thought reasonable that these *Beans* being brought North by the *Current* from the *Gulf* of *Florida*, are put into the westerly *Wind's Way*, which generally blow at least two Parts of three of the whole *Tear*, and may be suppos'd by this means at least to arrive at *Scotland*.

By the same Means that these *Beans* come to *Scotland*, it is reasonable to believe that the *Winds* and *Currents* brought from *America* those several things towards the *Azores* and *Porto Santo*, which are recorded by *Fernan. Colon*, in the Life of his Father *Christopher*, to be some of the Reasons that mov'd the said *Chr. Columbus* to attempt the Discovery of the *West-Indies*.

Cap. 9.

VII. *Hirta* lies from *Snod* in *Skye Island*, W. b. N. From the nearest Land to it in the *Hereisch* (from whence People ordinarily take Boat) it lies due *West*; and is about 50 Miles from the nearest Land.

A Description
of the Island *Hirta*,
by Sir R. Moray:
n. 137. p. 927.

There are 3 *Islands* together, *Hirta*, *Soa*, and *Burra*; but *Hirta* only is inhabited. The other Two are excellent Pasturage for Sheep, every Sheep there having 2 *Lambs* every Year.

In *Burra* there is no landing, but to the Men of *Hirta* only, in regard of the difficulty thereof; there being but about a Foot broad of Landing-place, and that only to be attempted when the Boat rises. For their ordinary way is, when they come near the Rock, they turn their Boat, and set the side to the Shore, two Men, one at each end of the Boat, with two long Poles keeping it off, that the Waves dash it not so violently against the Rock, when it rises; at which Time only the Fellow, who is to land, makes his Attempt. If he miss his landing place he falls into the Sea, and the rest of the People hale him a-board; he having before a small Rope fasten'd about his Middle to prevent that Danger. But when he safely lands, (which they seldom miss to do) the rest of his Fellows land one by one; except so many as they leave to attend their little Boat, which ordinarily is of 16 Oars.

If there be any *Strangers*, (as many go from the nearest Islands in Summer) they must be ty'd about the Middle with a strong Rope; and when the Men of *Hirta* have climb'd up to the Top of the Rock (which is above

24 Fathoms

24 *Fathom* before they set their Foot on *Grass*) they hale up the Strangers to them with the Ropes. When they have gather'd as many *Eggs*, and kill'd as many *Fowls*, as will load their Boat, they lower all into the Boat, and the ablest Fellow is always left behind ; who having none to help him, must throw himself into the Sea, and so recover the Boat. This *Burra* lies from *Hirta* about 6 *Miles Northward*.

Soa lies near *Hirta*, on the *South-West*. In this, except *Fowls*, there is only remarkable a *Creek*, where great *Seals* haunt. The People are so mad, that they go in their Boat, about 4 of them, in that narrow Passage, to kill these *Seals*, with Poles ; having scarce Room for their Oars, and every where seeming to close up the Mouth thereof. If the Wind changeth, during their being there, it is not possible to save either Man or Boat.

There are several *Rocks*, rising out of the Sea, amongst these *Islands*, which the People of *Hirta* call *Stacks*; some 10, 20, 24 *Fathoms* above Water, without any *Grass* upon them. On the round Tops of the *Rocks* a great Number of *Fowls* breed, and in all the Cliffs. Amongst the rest there is one call'd *Stacka Donna*, upon the Top whereof breedeth such an abundance of *Fowls*, that though it seems inaccessible, yet the Men of *Hirta* have ventur'd to go thither. After they have landed with much difficulty, a Man having room but for one of his Feet, he must climb up 12, or 16 *Fathoms* high. Then he comes to a Place, where having but room for his left Foot and left Hand, he must leap from thence to such another Place before him ; which if he hit right, the rest of the Ascent is easy : and with a small Cord, which he carries with him, he hales up a Rope, whereby all the rest come up. But if he misseeth that Footsteep (as often times they do) he falls into the Sea, and the Company takes him in by the small Cord, and then he tries it again.

Hirta Island is two *Miles* in Length, accounted *Five-penny Land*. In it there are ten Families. The Men seldom grow old ; and seldom was it ever known, than any Man dy'd in his Bed there, but was either drown'd or broke his Neck. They are strong, big, and well-skinnd. Their Food is only young *Fowls* and *Eggs* ; they Drink *Whey* and *Water*. They are much given to keeping of *Holy-Days* ; having a Number of little *Chappels*, where sometimes they watch whole Nights, making merry together with their Offerings.

The most Service of their *Women* is to harrow their Land ; which they must do, when their *Husbands* are climbring for *Fowls* for them.

Their ordinary way of dividing their Land, is one *Half-penny* to every Family. The *Rocks* also are divided, such an one on every *Half-penny*. And there is a kind of *Officer* left by the Master of the Island, who governs in his Absence, and so regulates, that the best *Climbers* and worst are mix'd together, that so none of the Land be unlabour'd ; that is, that all the Shelves of the highest *Rocks* be search'd for *Eggs*.

The way of their climbing, when they kill their *Fowls*, is thus ; they go two and two with a long Rope, not made of *Hemp*, but of *Cow-Hides* salted,

fasted and the Thongs cut round about, and platted 6 or 9 Fold. Each end of the *Rope* is ty'd about each one of their Middles, and he that is fore-most goes till he comes to safe Standing; the other standing firm all that time, to keep him up in case his Foot should have slip'd: when the fore-most is come to a safe Standing, then the other goes, either below or above him, where his Business is; and so they watch time about; seldom any of them being lost, when this is observ'd.

The foresaid *Officer*, when any Couple is to be *Marry'd*, brings them to one of their *Chappels*, and administers an *Oath* to them; so they are *Marry'd*. Their *Children* when they come to the Age of 15 or 16, or thereabout, come with the Master of the *Isle* to the *Hereisch Island*, and are there baptiz'd.

An ordinary way of killing the *Fowls* in the *Mist* is this, some of these Fellows lie beside the Door of the little House they have in their *Islands*, flat upon their Backs, and open their Breasts: which when the *Fowls* perceive, they sit upon them, and are presently catch'd, and their Necks broke. One Fellow has kill'd *Hundreds* of *Fowls* in one Night after this manner.

Sometimes they set *Grins* on the very Top of the highest Rocks, and make them strong for *Great Fowls*. One being setting of these *Grins*, as he was walking along his great Toe was Catch'd in one of them, which made him stumble and fall down: yet the *Grin* being fast and strong, kept him hung with his Head downward, till those that mis'd him came in the Morning, and found him so fallen.

VIII. 1. All the Tribes of *Fowls* are observed to have their *Sentinels*; especially in the Night: the *Watchfulness* of the *Scart* is true to a Proverb. I have known one, who by surprizing the *Sentinel*, caught 300 in a Night.

Observations in the North Isles of Scotland, by Mr. Martin Martin. m. 233. p. 727.

2. The want of *Rain* at the usual time of laying *Eggs*, hinders the *Sea-Fowls* from laying for some Time.

3. If the *April-Moon* goes far in *May*, it hinders the *Sea Fowls* from laying 10 or 12 days longer than is ordinary.

4. A Poor Man of *Rowdill*, in the *Isle Harries*, notourly known by the Name of *St. Clements Blind*, though his sight served him to travel alone through all *Harries*, *Skie*, &c. Yet he was struck *Blind* (which confines him to his Bed) two Days before the *New-Moon*, at which Instant he recovers his Sight. In this he never erred once in his Life-time, for which he was called the *Infallible Almanack*.

5. The Children of *Ferintosh* in *Ross*, are taught from their Infancy to Drink *Aquavita*, and are observed never to have any *Worms*.

6. Many in the *High-lands*, who pretend not to any Skill in *Chirurgery*, do venture to cut the *Uvula* off when they are troubled with it, and prescribe for a Remedy thereafter a piece of Bread and Cheese: Which is attended with good Success, without hindring the Speech.

7. In many of the *Isles*, the Commons apply *Spearwort* for Pains of the Head; being bruised and applied, it raises a *Blister*, from which issues much

much matter, and this they find very effectual for *Pains in the Eyes, Head, Arm, or Leg.*

8. They do likewise beat the *Juice* out of it, which they drink for *Purg- ing* : which they do frequently with good success, and to prevent *Excoria- tion* of the *Throat* they drink a little *melted fresh Butter.*

9. *Anna George*, who continu'd in the state of *Virginity* till the 51st *Tear* of her Age (as is evident by her declaration on her death-Bed) marry'd and brought forth a boy in the 52^d *Tear* of her Age, having 2 *Teeth* in his Head.

10. Another Woman in *Lewis*, was 7 *Tears* bringing forth a *Child*, Bone after Bone, and all by the *Fundament.*

11. A Boy in the Isle of *Skie*, aged 16 *Tears*, has a faculty of Erecting his *Ears* at his *Pleasure.* There are several Towns in *Skie*, where the *sheep* have no *Marrow* ; all these Towns are *Rocky, high, and very Windy.*

12. The Inhabitants of *St. Kilda*, are every Summer infected with a *Cough* upon the *Chamberlain's* landing, which lasts for 10 or 12 *Days*, and the usual Remedy for it is *Gibben* drunk upon *Brochan* of Meal and Water. This *Gibben* is the fat of *Sea-Fowls* preserved in the Stomach ; a Sovereign Remedy for *Coughs* and *green Wounds.*

Several Things
in Ireland in Com-
mon with the
West-Indies; by
Dr. Tho. Moli-
neux. n. 227.
p. 507.

IX. That there is a sort of Alliance between *Ireland* and the *West-Indies*, appears in several things, of which they partake both in common. For as they on the Coast of *New-England* and the Island *Bermudas* gather considerable Quantities of *Ambergriese* ; so on the *Western Coast* of *Ireland*, along the Counties of *Sligo, Mayo, Kerry* and the Isles of *Arran*, they frequently meet with large Parcels of that precious Substance, so highly valued for its *Perfume.* In the *Tear* 1691, Mr. *Constantine*, an Apothecary of *Dublin*, shewed me one piece of *Ambergriese* found near *Sligo*, that weighed 52 Ounces. On the outside 'twas of a close compact Substance, blackish and shining like *Pitch* : But when it was cut the inside was more Porous, and something of a *Yellowish Colour* ; not so grey, close and smooth as the cleanest and best sort of *Amber*, but like it speckled with whitish Grains, and of a most fragrant Scent. I have still a piece of it by me, that weighs above 6 *Drams*, with several samples of 3 or 4 other sorts of *Amber*, all found on that Coast of *Ireland* ; some entirely black as *Pitch*, others of a perfect white Substance, exactly answering the Description of that sort of *Amber*, *Olaus Wormius* mentions in his *Museum*, under the Name of *Ambræ Griseæ nondum matura.*

P. 34.

Whale Animal.

Nor is the kind of *Whale-Fish*, that's often taken in *New-England*, and affords the true *Sperma Ceti*, a stranger to the Coast of *Ireland*, that respects *America.* This we may properly, I think, with Dr. *Charleton* call the *Cetus Dentatus*, from its large, solid, white Teeth, fix'd only in the *Lower-Jaw*, to distinguish it from that species that gives the *Whale-Bone*, most naturally named by *Aristotle*, *Mylicetus*, from its bearded, horny *Lamina* in the Roof of its Mouth : Of which kind likewise there have been 3 or 4 stranded in my time, but on the *Eastern Coast* of this Country that regards *England.*

This

This *Cetus Dentatus* is truly figured by *Johnstonus* and *Mr. Ray*. There Hist. Pisc. Tab. 42.
 have been three of this Kind taken to my Knowledge, in the space of 6 Ichthyogr. Tab. 8.
 Years all on the western Coast of this Country; one near *Colerane*, in the
 County of *Antrim*; another about *Ship-harbour*, in the County of *Don-*
negal; and a 3d in *Aug. 1691*. 71 Foot long, towards *Bally-shannon*, where
Lough-Erne discharges its Waters into the *Western Ocean*.

And then it was, I had an Opportunity of truly informing my self what
 sort of Substance *Sperma Ceti* is, and in what part of the *Whale* 'tis found;
 concerning which Matter *Physicians* and *Naturalists* have given the World
 such various and false Accounts. 'Tis truly nothing else but part of the
Oyl, or *Liquid Fat*, of this particular Sort of *Whale*; which *Oyl*, at first,
 when confus'd and mixt, shews it self like a *whitish Liquor*, of the Con-
 sistence and Colour of *Whey*, but laid by in Vessels to settle, its parts by
 Degrees separate; that which is lighter, and swims a Top, becomes a
 clear *Oyl*, pellucid like Water, serviceable for all the Uses of common
Train-Oyl, got out of the *Blubber* of other *Whales*, and that which subsides,
 because 'tis heavier and of a closer Consistence, candies together at the
 Bottom, and is what is sold for *Sperma Ceti*, at 12 *Shil.* the *Pound*, when
 'tis thoroughly blanch'd and refin'd from all its Filth, and the remaining
 parts of the *Oyl*, that otherwise discolours it, and gives it a rancid offen-
 sive Scent. Of this Substance several *Hundred Pound Weight* may be got-
 ten out of one *Whale*, but the cleansing and curing of it is troublesome,
 and requires no small Art, Time, and Charge: which occasions the Value
 of that which is thoroughly refin'd. The *Fat* of the whole Body affords
 it; but that of the *Head* gives the greatest Quantity and purest *Sperma*
Ceti.

I have some reason to believe, that to these Instances of *Amber Griesse* and Vid. Vol. II.
Sperma Ceti (besides those of the *Moose-Deer*, (the *Horns* whereof are fre- Cap. III. Sect.
 quently found under Ground, and were formerly describ'd), of which *Ire-* XXXVI.
land partakes more than any other Country of *Europe*, from its Neigh-
 bourhood with the *Northern America*,) we may likewise add some of our
 more rare spontaneous *Plants*; because they are found growing only in
 those western Parts of *Ireland*, and no where else in the whole Country, or
 any of the neighbouring Kingdoms about us. I shall mention but 2 or 3
 of many which I have been told are peculiar to those Parts; and those are
 the *Arbutus sive Unedo*, or the *Strawberry-Tree*; not to be found any where of
 spontaneous Growth nearer than the most southern Parts of *France*, *Italy*,
 and *Sicily*, and there too 'tis never known but as a *Frutex* or *Shrub*. Where-
 as in the rocky Parts of the County of *Kerry* about *Lough-lane*, and in
 the *Islands* of the same *Lough*, where the People of the Country call
 it the *Cane Apple*, it flourishes naturally to that Degree, as to become
 a large tall Tree. *Petrus Bellonius* takes Notice, that it does so in Mount
Athos in *Macedony*; and *Juba* is quoted by *Pliny*, as mentioning a Thing
 extraordinary, for saying the *Arbutus* grows to a high Tree in *Arabia*.
 The Trunks of those in *Ireland* are frequently 4 Foot and a half in Circum-
 ference, or 18 Inches in Diameter; and the Trees grow to about 9 or 10

Turds in Height ; and in such Plenty that they now cut them down, as the chief Fuel, to melt and refine the Ore of *Silver* and *Lead-Mines*, lately discover'd near the *Castle of Ross*, in the County of *Kerry*.

The other Plant I shall take Notice of is *Cotyledon, five Sedum Serratum Latifolium Montanum Guttato Flore Parkinsoni & Raii*, vulgarly call'd by the Gardeners *London-Pride*: I suppose because of its pretty elegant Flower, that view'd near at Hand and examin'd closely, appears very beautiful, consisting of great variety of Parts. The whole Plant is most accurately describ'd by that profound Naturalist Mr. Ray: But he knew no certain Place where it grew spontaneous, not having met with it in all his Travels; nor any Author mentioning its native Country. It grows plentifully here with us in *Ireland*, on a Mountain call'd the *Mangerton* in *Kerry*, 6 or 7 Miles over, and reputed the highest in *Ireland*, 2 Miles from the Town of *Killarny*, and 4 Miles from the *Castle of Ross*: Here it spreads it self so abundantly, as to cover great part of the Mountain, and forasmuch as I understand, like the *Arbutus*, 'tis peculiar to this Country alone.

New England
Rariss.

Whether both the foregoing Plants are truly *American*, I cannot at present determine; but this I know, that *Sabina Vulgaris*, or common *Savin*, is mention'd by Mr. *Josselyn*, as a Plant common on the Hills of *New-England*; and I have been assur'd by an Apothecary of *Dublin*, that he has gather'd *Savin* growing wild as a native Shrub in one of the Islands of *Lough-lane*, in the County of *Kerry*; and if so, I have Reason to believe that hereafter farther Inquiry may add to these I have here given, several other Examples of things natural and common to that and this Country.

Observations
made in a Voyage
from England to
the Caribbee I-
lands, by Dr.
Stubb's. n. 27.
p. 493.

X. I. I took Notice at *Deal*, where I set Sail for *Jamaica* of the great Difference in the rusting of *Iron*, in such Houses as front the Sea, in comparison of that Effect in the Street immediately placed behind the other, in which I made this Observation. They told me, that it rusted more at high Floods than at neap Tides; the Height of the Beach hindering the saline Exhalations. This Remark put me in mind of the Vanity of the Argument of M. *Lignons* and others, viz. That the Air of the *West-Indies* was hot and moist, because of the rusting of *Iron*; whereas it indeed arises from some other Principle in the Air; for at the Point of *Cagua*, where it scarce raineth 40 Showers in a Year, *Iron* rusts as much or more than any where; yet are there other Parts of the Island, in which of 9 Months, not one passes without great Rain. Besides, in *Jamaica* it rusts least in rainy Weather.

The Steams of the Sea are found of such a Nature, that our Sweat-meats rotted; Sugar of *Roses*, and other *Lozenges* grew moist; and those *Pyes* and *Gammons* of *Bacon*, which had kept well before, after they had been once expo'd to the open Air, decay'd more in a Day or 2, than in 6 Weeks before.

On the point *Cagua*, the *Iron Guns* of the *Fort* were so *corroded*, that some were near become useless; being perforated almost like *Honey-Combs*: But the *Guns* which lay in the *Salt-Water*; were not much endamaged by *Rust*, as we found upon taking up of some.

Many things receive damage by the *Air*: Not only *Iron* rusts, but even *Linnen* rots, and *Silks* once expos'd to the *Air* do rot without losing their *Colour*. If a *Lancet* be once expos'd to the *Air*, it will *Rust*, though you presently put it up again: but if it be never expos'd to the *Air*, it will hardly *Rust*.

At *Deal* a certain *Ale-Seller* will warrant, that the *Ale*, as he orders it, shall be carry'd good to the *West* or *East-Indies*. His way to prepare it is this, (as he told me himself,) he twice *Mashes* it with fresh *Malt*, and twice *Boils* it well: yet all this kept it not from *Souring*; as I observ'd, during my stay there. We bought of it to carry to *Jamaica*, and then he directed us thus; To every *Rundlet* of 5 *Gallons*, after it is placed in the *Ship*, not to be stirr'd any more, put in two new laid *Eggs* whole, and let them lie in it, he said, that in a *Fortnight* or little more, the whole *Egg-shells* would be dissolv'd, and the *Eggs* become like *Wind-Eggs*, inclos'd only in a thin *Skin*: after this, the whole *White* would be prey'd on, but the *Tolk* would not be touch'd or corrupted. By this means we did preserve the *Ale* to *Jamaica*, and it was much better than at *Deal*.

Concerning the *Thames Water*, It is not only *Observable*, that in 8 *Months* time it acquires a *Spirituons Quality*, so as to *Burn*, like *Spirit* of *Wine*; (and some *East-Indies-Ships* I am inform'd, have run the hazard of *Firing*, by holding a *Candle* near the *Bung-hole* at the first opening of the *Cask*;) but also that the *Stinking* of it is no *Corruption*, nor perhaps *Unwholesome*; for we drank it all the way so as to hold our *Noles*, yet had no *Sickness*, but we had a *Proportion* of *Brandy* each *Week*, which perhaps might correct it. If you take off the *Bung* from any *Cask* that *Stinks* and let the *Air* come to it, it will in 24 *Hours* become *Sweet* again; and if you take a broom-stick and stir it about well, it will become *Sweet* in 4 or 5 *Hours*, casting a *black Lee* to the *Bottom*, which remixes with it, and so occasions a 2d, or 4th *Fermentation*, and *Stench*; after which it *Stinks* no more. But though *Thames Water* upon *Stench* do not *Putrify*, yet *Other Waters* (as far as hath been hitherto observ'd) do become *Irrecoverable* upon *Stinking*, and dangerous to *Drink*.

I observ'd at *Sea*, after we were out of the *Narrow*, the *Sea* grew *Darkish*, and after perfect *Azure*: yet was it much more *Salt*, the farther we went, as I try'd by a *Water-Poise* which rose about half and *Inch*, above the *Sea-Water* in the *Downs*, and at 24 *Degrees* more 2 *Inches*. But after that I never observ'd any *Difference* unto *Jamaica*, the *Sea* being probably so impregnated with *Salt*, as not to imbibe more.

As to the *Colour* of the *Sea*, I conceive there is a great *Variety* in it and its *Streams*, as in grounds at *Land*; which may occasion the *Sickness* in some places more than in others: For the *Sea* *Smells* differently in the

Narrow and Main. And as to Colour, it is of a *Sea-green* (and more *Sickly* in the *Downs*, than at *Torbay*; and on *Plymouth Coast*, more than past the *Lands-End*; and in the *Bay of Biscay*, than in the *Long Reach*. Something perhaps may be imputed to the Difference of the *Waves*, which are *Short*, and make a *Copling-Sea* in the *Bay of Biscay* (yet we came not within 80 *Leagues* of *Cape Finis-Terra*;) in the *Long Reach* it is a *Long Rolling Wave*, but never *Breaks*. About *Florida*, *Virginia*, and *New-England*, it is a great *Rolling Wave*, but *Breaks*. And as the *Sea* coloureth from *Green* to *Darkish*, and so to *Blue*: so in our return it colour'd from *Blue* to *Dark*, and so to *Green*. When we were in the Latitude of *Barbadoes*, and had fail'd so for some Days, and apprehended our selves to be within 70 or 80 *Leagues*, I observ'd the *Sea* was *Black* and thick, not transparently *Blue*, as before, and the *Foam* against the *Ship* sides was turbid, and of another Consistence, than before: But when the *Sun* was high it turn'd *Green*; whereupon I ask'd the *Master*, who told me, we were within 60 *Leagues* of *Barbadoes*, and that the *Sea* was there *Soundable*, whereas before it was not so. But at *Barbadoes*, in the Anchoring places it was *Blue*; as we row'd ashore, in the shallow it was *Whitish*: And so at *Jamaica* near the *Shore* it is transparently *White*, but within 3 *Tards* more, transparently *Blue*.

As to the *Burning* of the *Sea*, I could never observe so great a *Light*, as to perceive *Fishes* in the *Sea*, off the stern: yet was the *Light* great, and at sometime more than other. I suppose several Subject *Earths*, *Currents* and *Winds* do vary it. I observ'd it *Burn'd* more at *Deal* the *Night* before we set *Sail*, than ever in the *Voyage*: All the *Water* ran off our *Oars*, almost like *Liquid Fire*; the *Wind* was then *S. E.* and the *Sea-men* told me, that at *East* and *South* *Winds* it *Burn'd* most.

I shall not trouble you with an Account, how two *Contrary Winds* poise each other, and make a *Calm* in the midst, *Ships* at a distance *Sailing* with *Contrary Gales* at the same time.

It is observable, that in the *Indies*, such Places as have any high *Mountains*, have also every *Night* a *Wind*, that blows from the *Land*, maugre the *Levantine Wind* which blows at *Sea* (but with a flacker *Gale* at *Night*; which seems to shew it depends not only on the motion of the *Earth*, but *Sun*.) There is none at *Barbadoes* or *Saona*: but at all the other *Islands*; And in *Jamaica* every *Night* it blows off the *Island* every way at once, so that no *Ship* can any where come in by *Night*, nor go out but early in the *Morning*, before the *Sea-breeze* come in. I have often thought on it, and could imagine no other reason, but that those *Exhalations*, which the *Sun* hath raised in the *Day*, make haste (after his strength no longer supports them) to those *Mountains* by a motion of similar *Attraction*, and there gather in *Clouds*, and break thence, by their own force and weight, and occasion a *Wind*, every way: For as the *Sun* declines, the *Clouds* gather, and *Shape* according to the *Mountains*, so that old *Seamen* will tell you each *Island* in the *Afternoon* towards *Evening*, by the *Shape* of the *Cloud* over it. And this *Attraction* appears further, not only from the *Rain* that gathers on the *Tree* in the *Island* of *Ferro*, spoken of by *Sir R. Hawkins* in his *Observations*, and *If. Vossius*

Tofius upon *Pomponius Mela*, as also *Magninus de Manna*; but also from the Rain in the *Indies*; there being certain Trees which *Attract* the Rain, so as that if you destroy the Woods, you abate or destroy the Rains. So *Barbadoes* hath not now half the Rains, it had, when more Wooded. In *Jamaica* likewise at *Guanaboa* they have diminish'd the Rains as they extend their Plantations. But (to return to *Jamaica*) that this *Night wind* depends much upon the *Mountains*, appears by this, that its force extends to an equal distance from the Mountain, so that at *Port-Morant* which is the *Eastermost* part of the Island, there is little of *Land-breeze*, because the Mountain is remote from thence, and the *Breeze* spends its force along the Land thither. I shall further Illustrate this kind of *Attraction*. In the *Harbour* of *Jamaica* there grow many Rocks, shaped like *Bucks*, and *Stags Horns*: there grow also several *Sea Plants*, whose *Roots* are *Stony*. Of these *Stone Trees* (if I may term them so) some are *Insipid*, but others perfectly *Nitrous*. Upon those other *Plants* with *Petrified Roots*, there gathers a *Lime-Stone*, which fixes not upon other *Sea-Fans* growing by them; It is observable also, that a *Monchinel-Apple*, falling into the *Sea*, and lying in the *Water*, will contract a *Lanugo* of *Salt-Peter*.

It is commonly affirm'd that the *Seasons* of the *Year*, betwixt the *Tropicks* are divided by the *Rains* and *Fair-Weather*, and 6 *Months* are attributed to each *Season*. But this *Observation* holds not generally true: For at the *Point* in *Jamaica* scarce fall (as we hinted above) 40 *Showers* in a *Year*, beginning in *August* to *October* Inclusive. From the *Point* you may look towards *Port Morant*, and so along to *Ligonee*, 6 *Miles* from the *Point*; and you'll scarce see, for 8 or 9 *Months*, beginning from *April*, an *Afternoon* in which it rains not. At the *Spanish Town* it rains but 3 *Months* in the *Year*, and then not much. And at the same time it rains at *Mevis*, it rains not at the *Barbadoes*. And at *Cignateo* (otherwise call'd *Eleutheria*) in the *Gulph* of *Bahama*, it rains not sometimes for 2 or 3 *Years*; so that that Island hath been twice *Deserted* for want of *Rain* to Plant it.

At the *Point* of *Jamaica*, where ever you dig 5 or 6 *Foot*, *Water* will appear, which *Elbs* and *Flows* as the *Tide*. It is not *Salt* but *brackish*; unwholesome for *Men* but wholesome for *Hogs*. At the *Caymans* there is no *Water*, but what is *blackish* also; yet is that wholesome for *Men*, in so much that many are recovered there by feeding on *Tortoises*, and yet Drink no other *Water*. The *Blood* of *Tortoises* is colder than any *Water* I ever felt there; yet is the *beating* of their *Heart* as vigorous, as that of any *Animal* (as far as I have observed,) and their *Arteries* are as firm as any *Creatures* I know: which seems to shew it is not *Heat* that hardens the *Coats* of the *Arteries*, or gives *Motion* to the *Heart*. Their *Lungs* lie in their *Belly* below the *Diaphragm* extending to the end of their *Shell*. Their *Spleen* is *Triangular*, and of a firm *Flesh* (no *Parenchyma*) and floridly *Red*. Their *Liver* is of a *Dark-Green*, inclining to *black* and *Parenchymatous*. In the *Oesophagus* are a sort of *Teeth*, with which they *Chew* the *Grass* they eat in the *Meadows*, which there grows at the *Bottom* of *Sea*. All the *Tortoises*, from the *Caribbees* to the *Bay* of *Mexico* and *Honduras*, repair in *Summer* to the *Cayman Islands*,

Islands, to lay their *Eggs*, and to *Hatch* there. They *Coot* for 14 *Days* together, then lay in one *Night* some 300 *Eggs*, with *White* and *Tolk*, but no *Shells*; then they *Coot* again, and lay in the *Sand*; and so *Thrice*. Then the *Male* is reduced to a kind of *Gelly* within, and *Blind*, and is so carry'd Home by the *Female*. Their *fat* is *Green*, but not offensive to the *Stomach*, though you eat it, as broth, *Stew'd*. Your *Urine* looks of a *Yellowish-Green*, and *Oily*, after eating it.

There is no manner of *Earth*, but *Sand* at the *Point*; yet I have eaten admirable *Melons*, *Musk* and *Water Melons*, that have grown there. A great many *Trees* also grow there, especiall y *Mongranes* and *Prickle-Pears*.

In some *Ground*, that is full of *Salt-Peter*, your *Tobacco*, that grows *Wild*, *flashes* as it is *Smoaked*.

The *Fruit* of *Trees* there of the same kind ripen not at one *Time*: There is a hedge of *Plum-Trees* of 3 *Miles* long, as you go to the *Spanish Town*; on it I have many times remarked some *Trees* in *Flower*, others with *Ripe*, others with *Green Fruit*, and others to have done *Bearing*, at the same time. *Jasmins* I have seen to *blow* before their *Leaves*, and also after their *Leaves* are *fallen* again.

The *Sower-sap*, a pleasant *Fruit* there, hath a *Flower* with 3 *Leaves*; when these open, they give so great a *Crack*, that I have more than once run from under the *Tree*, thinking it all to be *tumbling* down.

There is a *Bird*, call'd a *Pelican*, but a kind of *Cormorant*, that is of *Taste Fishy*, but if it lie *Buried* in the *Ground* but 2 *Hours*, it will lose it that *Taste*, as I have been told for certain.

I try'd some *Analysis* of *Bodies* by letting *Ants* eat them; and I found they would eat *Brown Sugar*, *White*, and at last reduce it to an *In-sipid Power*. So they reduced a *Pound* of *Salet-Oil* to 2 *Drams* of *Powder*.

At our first coming there we *Sweat* continually in great *Drops* for 3 *Quarters* of a *Year*, and then it ceaseth: During that *Space* I could not perceive my self or others more *Dry*, more *Cosive*, or to make less *Urine*, than in *England*: Neither does all that *Sweat* make us *Faintish*. If one be *Dry*, it is a *Thirst* generally arising from the *Heat* of the *Lungs*, and affecting the *Mouth* which is best *Cooled* by a little *Brandy*.

Most *Creatures* *Drink* little or nothing there, as *Hogs*; nay, *Horses* in *Guanaboa* never *Drink*; nor *Cows* in some places of the *Island* for 6 *Months*; *Goats* *Drink* but once perhaps in a *Week*. *Parrots* never *Drink*, nor *Par-roquets*; nor *Civit Cats*, but once a *Month*.

The hottest time of the *Day* to us, is 8 in the *Morning*; when there is no *Breeze*. I set a *Weather-Glass* in the *Window*, to observe the *Weather*, and I found it not rise considerably at that time: But by two of the *Clock* it rose 2 *Inches*.

Venice Treacle did so dry in a *Gally pot*, as to be *Friable*; and then it *Produc'd* a *Fly*, call'd a *Weavil*, and a sort of *white Worm*. So did the *Pilule de Tribus* produce a *Weavil*.

There

There is in the midst of the *Island* a Plain call'd *Magotti Savanna*, in which whensoever it rains, (and the *Rain* passeth along the *Island* before it falls there) the *Rain*, as it settles upon the Seams of any Garment, turns in half an *Hour* to *Maggots*; yet is that Plain healthful to dwell in.

All the Alteration our *Sweet-Meats* and *Lozenges*, and *Gammons* of *Bacon* underwent, must be attributed to some peculiar Principle in the *Air*: For in all our Voyage to *Barbadoes*, we had not one Shower, that I remember: And if any will have the *Air moist*, whilst a constant *Levant* (that is a drying) Wind fills our Sails, at least during the *Long-reach*, how comes it to pass, that so much *Heat* joyn'd with *Moisture* doth not occasion putrid Fevers? And why in all that Journey, and after in *Jamaica*, when the Glasses for many Weeks stood open and uncover'd, did not the *Lixivate Salts* of *Wormwood* and *Ash* contract any *Moisture*? I am sure, I never set any *Salts* in the *Sun* or near a *Fire*, during my stay there, to preserve them, or to restore them to their coagulated Force. Nor will other *Sea-Salts* there lose much, if not kept dry by a *Fire*, no, nor lying on the Ground. For, I have seen it kept so; yet if it immediately touch the Ground, some of it will moisten away. But I have seen *Tortoises* dry-salted, and lie on the Ground cover'd with *Salt a Tear*, and the *Salt* under all the Vicissitudes of Weather never give much, or spoil the salted *Tortoise*.

The way of drinking *Brandy* with *Water*, which Sir *Christopher Mings* observ'd, was this: First to take a Mouthful of *Brandy*, and whilst it was yet hot in your Mouth and unswallow'd, to drink the *Water* and so wash it down; it being his and a common Observation at *Sea*, that it was ever wholesomer to drink it so, than either mixt with the *Water*, or after it. For, said he, if you drink the *Water* first, it gives instantly such an Impression of the Coldness to your *Stomach* and *Lungs*, as that it is too late to correct it by the succeeding *Brandy*. Which Reason I could not but allow of; for in those Parts the Passages or Porosities of the Body are so pervious, that what you drink, though cold, instantly dischargeth itself in *Sweat*, or checks your constant and necessary *Diaphoresis*, before you can get the subsequent *Brandy* down. And Man is so exact a Machine, that a much less thing disorders him there, than here. And if a little *Brandy* should be mixt with a Draught of *Water*, it would not be efficacious; the Coldness of the *Water* being more powerful in Bodies so tender as we are there, if hot, to hurt them, than so little *Brandy* to correct it. But the other Way washes the *Brandy* down first, and as that goes, it fortifies Nature every where to receive and distribute the subsequent cold Liquor.

About the Colour of the *Sea*, I have this to add, That as we went, and pass'd from a green *Sea* to an *Azure*, in the Way when it was dark-colour'd the Top of each *Wave*, as it was cast up before the *Sun*, shew'd itself to be *Azure*, the rest of the *Wave* being dark-colour'd approaching to black. And the like I observ'd coming Home; for, though the *Sea* in its dark Colour resembled exactly what we saw before, as we went out; yet did the Tops of the *Waves* break and appear green, long before the great
Waves:

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Waves or *Body* of the *Sea* became *green*. I observ'd, that the *Sea*, which was *Azure*, and transparent in sun-shiny Days, was *black* and *dark-colour'd*, and much less transparent, when the Sun did not shine. But in the *Green-Sea* there happens not the like Difference.

As to those *Plants*, whose *Roots* I said were *stony*, it may be noted, that some of their *Roots* are totally *petrify'd*, some only in part; the rest being of another kind of more vegetable-like Consistence; whilst the *Boughs* and *Trunk* are of another Nature.

Of the *Water* at the *Point* of *Jamaica*, I shall further observe, That, though the *Sand* does so *percolate*, that you find it upon digging 5 or 6 *Foot* deep; yet from that *Sand* there arises no *Steam* into the *Air*, notwithstanding the Heat of the Country. For Proof hereof, I observ'd, that Men would lie all Night, and sleep on the *Sands* without hurt. And to take Notice of that particular upon this Occasion, 'tis an usual thing for the *Weavil* (or *Fly* that breeds in *Meal*, *Currants*, *Raisins*, &c.) to be thus cur'd: After that the Sun hath heated the *Sand*, they spread a Sheet, and on that spread their *Meal*, *Currants*, &c. the *Sand* being *hot* under, the said *Weavils* retire from the Bottom to the upper Parts; and these being *beated*, they retire all into the middle, and thence, being heated, they are forc'd to run away out, and are so swept away. And if you spread the Sheet on the *firm Ground*, though never so much heated with the Sun, it will presently grow *damp* there, and the *Weavils* will lodge themselves at the Bottom; so as that you can never separate them any where else, but on the *Sand*. Also in the Nights I observ'd, that between the other Ground and our pendulous *Hamacks*, there gather'd not only a greater *Coldness* of *Air*, but also *Moisture*, than was observable at the *Point*, when we hung in the like Posture. It is true, that the Reason is obvious, why there should be an *Air* under the narrow Passage betwixt the *Hamack* and the *Ground*, which is not observable above it; but there is also a *Dampness*, so that I was forc'd to put Blankets betwixt me and the Bottom, whilst I had never an one to cover me a top.

During an Hour or two's Stay at the *Caymans*, I examin'd that Assertion of *M. Lygon's*, That a *Tortoise* hath 3 *Hearts*; and I found it false: For, although the Resemblance of the two *Articles* be such, as also their Bodies or *Flesh*, as to deceive the unwary Observer, yet is there but one *Heart* triangular and fleshy, the other two are only the *Auricles*, yet of the same Shape and Body. The two *Auricles* move at a several Time from the *Heart*, and they are distanced from the *Heart* about an *Inch*; and the Passage fleshy (as I remember) and narrow by which the *Blood* is infused into the *Heart*. This *Heart* hath but one *Ventricle*; yet are there several Columns of *Flesh* and Receptacles in it, such as are not in the *Auricles*.

The *Grass* of the *submarine Meadows* is not a Span long, that I could observe, and is of a *Green* approaching to *Yellow*. The *Tortoises* bite much more than they swallow, so that the *Sea* is cover'd with the *Grass*, where they feed at the Bottom. Once in about half an Hour they come up, and fetch one *Breath* like a Sigh, and then sink down again: And if cut
of

of the Water, they *Breathe* somewhat oftener. If you hurt them on Shore, as they lie on their Backs, the *Tears* will trickle from their Eyes. You may keep them out of the Water 20 Days and more, and yet they will be so fat as to be fitting Meat, provided you give them twice a Day about half a Pint of Salt-water. The *Fat* that is about their Guts is *Yellow*, though that of the Body be *Green*. The *Head* being cut off, dies instantly; and if you take out the *Heart*, the *Motion* continues not long. But any Quantity of the *Flesh* will move, if prick'd, and also of it self, for many Hours after it is cut into Quarters; and the very *Joints* of the *Bones* of the *Shoulders* and *Leggs* (answering our *Omo-plate* and *Thigh*, yet within the *Shell*) have their *Motion*, and even though you prick only the *Fat* of it. But if you place the Parts of the *Tortoise* in the Sun, they presently Die. These *Legs* Die as soon, in a manner, as cut off.

The Eggs of *Crocodiles* and *Alligators* are little bigger than a *Turkey's*; the *Shell* is as firm, and like in Shape, to a *Turkey's*, but not spotted. I enquir'd into the Stone in the *Stomach* of a *Cayman* or *Crocodile*, and I found by the enquiry of a very observing Gentleman there, that they were nothing but several Stones, which that Creature swallows for *Digestion*. He took out of one a piece of a Rock as big as his Head: out of others he had taken 16 or 20 lesser. None regards them much there, whatever *Morades* relateth.

I could not hear of any Stones found in the *Gall* of the *Hogs* there; but 'tis usual to find little Stones in their *Bladder* of several sizes, but the Shapes of them (none weighing a *Scruple*) were *Angular*, and Pointed with 5 *Angles*.

De Laet is in the right as to his Description of the *Manati-Stone*. But he is out in his *Lapis Tiburonum*: For though a *Tiburon* and *Shark* be all one, and differ from a *Manati*, or *Sea-Cow*: yet, by his leave, though that same be a kind of *Friable Calx*, when it is brought hither, yet when it is first taken out, it is not so, but a white Substance, near approaching to the Nature of any *Brain*, and encompass'd in a transparent Gelly. The Gelly dries all away as it is expos'd to the Sun: and the white Substance dries into the Body, he speaks of. If my Memory fail me not extremely, it is taken out of two places over each Eye; and both being usually by Seamen put into the same Paper together, to dry, pass for One. That Creature hath no Bone in his Back, as vast as his Strength is; only in his Head there are Bones. His Jaws are *Griffles*; and he hath Rows of Teeth, which are Bones like *Lancets*, and moveable in him, to erect, or lay flat; and multiply to 3, or 4, or 5, (perhaps more) as he grows in Years. His Back-bone is all gristly (and so are his Ribs) yet divided into *Vertebra*. The Seamen usually cut them into walking-slaves. They and the *Dolphin* swim faster than any Ship sailing: So do the *Spanish Maccarel* also.

Civet Cats, if you do not give them *Drink* at all, they will not die in a longer time than a Month. But if they drink once a Month, they will yield more *Civet*, as I was told; and so if they be fed with *Fish*. Yet

they piss much, as do *Rabbits*. In those places where there is no *Rain* for a whole Month, or longer, nor any River or Pond, *Cows* lick the *Dew*, for a supply. A Butcher kill'd a Bull in an Island, where he could have no Water but what was Salt: he assur'd me, that his *Bladder* was dry'd up, so that he made very little or no *Water*; yet he must be guess'd to have liv'd in that Island before the *English* came thither; which was 6 *Years* before he was kill'd.

The *Swallows* in *Jamaica*, as hot as 'tis, depart in the *Winter-Months*, and the *Wild-Ducks* and *Teal* come hither then.

The so sam'd Tree, call'd a *Cabbage Tree*, I assure you, is nothing else than a *Palm-Tree*: and all that is eaten as the *Cabbage*, is what sprouted out that Year, and so is tender. If eaten raw, it is as good as any *New-Almonds*; and if boil'd, excels the best *Cabbage*. When that *Top* is cut off, the Tree dies. There was one of those Trees at *Barbadoes*, above 300 Foot high, as I was told for certain. This Tree will never rot, and when 'tis dry'd grows so hard, that you cannot drive a Nail into it.

'Tis a mistake (above) that any *Tobacco* grows wild in *Jamaica* at least. The *Nitrous Tobacco*, which grows upon *Salt-Peter Ground*, will not come to so good a Colour, nor keep so long, as other *Tobacco*; infomuch that the Merchants oftentimes lose all their *Tobacco* in the Voyage for *England*, or *Ireland*, it rotting all by the way. In the same *Salt Peter Ground* the *Potatoes*, that are planted there, are ripe 2 Months sooner than elsewhere; but if they be not spent presently, they rot, the *Salt Peter* (as they told me) fretting the outward Skin of the *Root*, which is thinner in that sort of Ground than in other places. The *Sugar-Canes* also in those places grow larger and faster, than in other Grounds, but rot presently, if not ground; and do not boil so well to *Sugar*.

In *Jamaica* the *Sugar* cures faster in 10 Days, than in 6 Months at *Barbadoes*: And this happens on these places, where it *Rains* for many Months together; but you must know, that *Rains* there are sudden, and make no previous Alteration in the *Air* before they fall, nor do they leave it moist afterwards.

There is a Tree call'd a *Bastard Cedar*, whose wood is really so Porous (though you would not guess so upon View) that being turn'd into Cups, Wine and Brandy will soak through at the Bottom in a short time.

There are many kinds of Wood in the *Indies*, besides that of the *Acajou* or *Cajous*, that breed no *Worms*: and there is a Tree call'd *White-wood*, in *Jamaica*, of which if you build Ships, they will never Breed any *Worm*.

The *Soap Tree*, I have seen growing at the *Spanish Town*: and the *Berries* of it (being as big as Bullets of *Musquets*) without any proportion of *Salt Lixivate*, or *Sulphur*, or *Oyl*, wash better than any *Castle-Soap*; but they rot the Linnen in time.

They have in *Jamaica* 3 *Barks* to Tann with, the *Mangrove*, *Olive-Bark*, and another. They Tann better than in *England*, and in 6 Weeks the *Leather* is ready to work into Shoes.

The Juice of *Manioc*, or *Cassavi*, is rank *Poison*. All *Hogs* and *Poultry* that drink it swell and die presently. If the *Root* be roasted, it is no *Poison*, but only occasioneth *Torsions* in the *Belly*.

Concerning the *Oyl* of *Palma Christi*, the *Indians* use it for *Lamps*. It is a delicate, sweet and transparent *Oyl*: But I could never find it operate in *Physick*, notwithstanding I have given a *Spoonful* of it, and 3 in a *Clyster*. This *Palma* does yield an exceeding great Quantity of *Oyl*, and, did we mind any thing, might be a *Staple-commodity*. The *Leaves* applied to the *Head*, give great *Ease* to the *Head-ach*, as I have tried in my self; and it is the only *Remedy* of the *Indians* and *Negroes*.

The *Manchinel-Tree*, is a *Wood* of an excellent *Grain*, equalling the *Jamaica Wood*, but large to 4 *Foot Diameter*. The *Spaniards* turn it into *Beds*, and the *English* usually floor their *Rooms* with it in *Jamaica*.

The *Birds* call'd by some *Fregati*, we call *Men of War*; their *Fat* is good against *Aches*, &c. So is that of *Alligators*, or the *Shell-Fish*, call'd *Soldats*, or *Souldiers*.

Of the *Shining* or *Fire Flies* there is a great *Difference* in *Hispaniola* and *Jamaica*, as to *Bigness*. They can contract and expand their *Light* as they fly, I am sure; and their *Light* continues some *Days* after they are dead: So that I am not of their *Mind*, who affirm, that 'tis the *Flammula Cordis* in their *Tail*.

The *Wood-Lice* will eat *Covers* and *Books*, though *Printed*, as I found to my *Cost*; and they will eat some *Sorts* of *Timber*, but not all.

When the *Cirons* or *Chegoes* come among the *nervous* and *membranous* *Parts*, they are very painful, and not to be pulled out, lest your *Needles* touch the *Nerves*.

I could never hear of any *Hurricane* about *Jamaica*, I enquir'd of some, that had been in *Hurricanes*, and they told me, that they had found it to be much colder then, than at other *Times*. I enquired of the *Nature* of these *Tempests*, whether the *Wind* varied all the *Points* of the *Compass*, as 'tis said: They answer'd, No; but it began always with a *North-Wind*, and when it came *East* it ceased: But betwixt the *North* and *East Point* it varied so fast, and with such a violent *Gust* always, that it was impossible for any *Ship* in the *Water* to answer the *veering* of the *Wind*; whence it happened, that the *Backs* of the *Ships* are broken, and the *Sails* and *Masts* carried by the *Board*. I saw a *Vessel* of about 400 *Tun*, whose *Main-Mast* (which is no small one in such a *Ship*) was wreathed as you would wreath a *With*, in an *Instant*, and so born by the *Board*, before ever they could hand a *Sail*.

As we sail'd for *England* and were to double the *Cape* at the end of *Cuba*, in order to our passing the *Gulph*; betwixt the 2 *Capes* of *Cartooche* towards the *Main*, and *Cape Antonio* in *Cuba*, there is a *Current* which sometimes sets *Westerly*, sometimes *Easterly*. If it set *Easterly* the *Ships* have a speedy *Passage* in 3 or 4 *Days* to the *Havana*; otherwise 'tis a *Fortnight* or 3 *Weeks* *Sail*, the *Ship* being imbayed in the *Gulf* of *Mexico*. To know which way the *Current* sets, in calm *Weather*, no *Wind* at all stirring, thus they try it. They hoist out their *Boat*, and having rowed a little from the *Ship*,
B b b b 2 they

they let loose their Plummet (ours did weigh 40 Pounds) and sink it 200 Fathom. Then though it never touches the Bottom, yet will the Boat turn Head against the Current (which constantly runs very strongly of itself, since so much of Sea runs into the Gulf of Mexico) and rides as firmly, as if it were fasten'd by the strongest Cable and Anchor to the Bottom. If you wonder to hear me mention a Calm thereabouts, where you would expect a constant *Levantine* Wind; I shall inform you, that it is no unusual Thing to meet with Calms, if you approach within any Distance of Land; for some Gist, or Land-Wind will so poize the *Levantine-Wind*, that you shall have a perfect Calm.

The Change of Climate, and the Effects of it are very sensible to our Bodies, as we approach the Tropicks. There usually happen'd Sickneses in our Ships about that Time; and as soon as the Seamen pass the Tropick they still use Expressions of Joy, by firing of Guns in Testimony of Gladness for their safe Arrival so far. I could not learn of the old Seamen any other Reason for the different Condition of Health, with which our Ships now sail, in Comparison of what our Ancestors experimented, than this: Generally all our Seamen and Passengers let Blood in the Voyage before that time. Yet is not that to be done rashly, nor by all in the same Degree of Latitude; for I carefully observ'd in our Ships the Alteration of our Bodies upon the Change of Climate, and found that the Blood of the English, which consists of Parts more gross, and is extracted from a more substantial Food, viz. that of *Flesh*, than in other Countries, did attenuate, and the Pulses in some became very lofty, full and quick; in others, slow, yet more lofty and full than before. In some there was a Sense of Pricking in their *Flesh*; in some a great Dulness, and Oppression of Spirits and Heaviness; after which they pass into a Condition of Sweating, which pursues them afterwards for a long time. From this Agitation of Humours, it is easy to shew the Reason, why our Ancestors fell sick, and how necessary it is to Bleed, when any feel those Symptoms in him; for immediately upon Bleeding the Pores are open'd, and they fall to Sweat; and by this Course, those numbers of People we carry'd over with us to *Jamaica*, arriv'd safe. Some I caus'd to be blooded in 32 Degrees, some in 28, some in 24, and 23 Deg. And in all our Ships there dy'd but three. In our Ship, Two had the Disease so much talk'd of, call'd the Calenture; but they were thus cured presently. I was talking with one of them, and on a sudden he beheld Green-leaves, as he imagin'd, floating on the Sea, which yet was Azure colour'd: after that he began to admire the fine Woods, which he fancy'd to be near us. I immediately gave him a Vommit of the Glasse of Antimony in Sack; which no sooner had wrought its Effect, but all those Imaginations vanish'd. At Night I gave him some Conserve of red Roses vitriolated, Salt of Wormwood and *Diascordium*; the next Days he was blooded at the Arm in the Morning; and in the Forehead in the Afternoon. His Diet was Water-gruel with Cream of Tartar in it; and also some Prunes stewed. I could perceive nothing of any Fever in the Disease; his Pulse was low, slow and equal; his Temper rather colder than ought to be; so far was he from any Sense of Heat, or Discoloration of his Tongue, or Thirst

Thirft. The other Person imagined nothing but *Groves of Oranges and Limons*, and beg'd the Opportunity of a Boat to go ashore, with great earnestness; so that if not watched, perhaps he might have leap'd into the Sea. The *Symptoms* were the same as in the other; only his whole Body seem'd to be much colder; yet was not he sensible of any *Coldness* in himself. I caus'd him to be vomited; and he was well in his *Head*, as soon as ever the *Vomit* made him sick at the *Stomach*, as yet not having wrought. I dieted him as the other, and only blooded him in the *Arm*. I let them *Blood* meerly out of Caution (for else they seem'd well) and to promote *Transpiration* and *Sweating*, which succeeded according to my Desire.

Undoubtedly the Seat of that *Disease* is in the *Stomach* and those Parts adjoining to it, in which the first *Concoction* is perform'd, and 'tis highly probable, that it principally ariseth from the *Ill-Diet*, by eating too much *Salt-Meat* in *Voyages*; the *saline Steams* from the *Stomach* affecting the *Brain* in a peculiar manner.

As to the *Cure* by *Vomiting*, I shall not now explain, how *Vomits* work; it sufficeth, that the *Disease* was seated in and about the *Ventricle*; and that in *hot Countries*, as well as in *hot Seasons*, the *Rule of Hippocrates* takes place, *Æstate per Superiora*. I never saw any good Effect of the most innocent *Purge*, during my Stay in the *Indies*, except in *Chronical Distempers*; nor did I ever almost give any (after frequent Trials had made me cautious) but *Pills* that were *Antimonial*, or *Mercurius Vita*, or *Vomitivæ Infusions*. And by this Method I preserv'd our Ships well, and effected those speedy *Cures*, which I think, none had before seen in *Jamaica*. It is true, of the common sort in the other Ships, when we came to *Barbadoes*, upon view I found many *Hydropical* and *Scorbutical*: And as soon as we came there, I caus'd all, that were any thing ill, to be vomited and purged with *Mercurius Vita*, the *Vomitivæ Infusion*, and *Cambodia*; by which Means and one Meal of *fresh Meat*, and some *Limons*, all the disorderly Rabble recover'd.

The *Sea-Breeze* comes not into *Jamaica* till 8 or 9 of the *Clock* in the Morning, and ordinarily ceaseth about 4 or 5 at Night: But sometimes the *Sea Breeze* blows in the *Winter Months* 14 Days and Nights together, and then no *Clouds* gather, but *Dews* fall. But if a *North Wind* blow (which sometimes in the *Winter Months* lasts as long) then no *Dews* fall nor *Clouds* gather. The *Clouds* begin to gather about 2 or 3 of the *Clock* in the Afternoon at the *Mountains* and do not embody first in the *Air*, and after settle there, but settle first, and embody there; the rest of the *Skie* being clear till Sun-set. So that they do not pass near the *Earth* in a *Body*, and only stop where they meet with *Parts* of the *Earth* elevated above the rest: but precipitate from a very great Height, and in *Partieles* of an exceeding rarified Nature, so as not to obscure the *Air* or *Skie* at all; that great Variety of beautiful Colours in the *Canopy* of *Heaven*, being raised to a much greater Distance than 'tis here.

The *Tortoises* float *Asleep* in a calm Day a long time; so that the *Seamen* row gently to them, and either strike them with *Irons*, or ensnare their *Legs* with a *Rope* and *Running knot*, and so take them.

I could never adjust the *Dose* of the *Purging Nuts*, having given from 3 to 60, without any Effect in the same Person, so that I never durst rely on them; yet they often do work, as is related.

Inquiring at the *Barbadoes* of the Doctors and Chirurgions there, about the Use of *Opium*, so much magnified by *Bontius* and *Piso*, I heard them all condemn it as most *stupifying* and *mortal*; and I found that they used the *London Laudanum*, which I have observ'd to be very *Narcotique*, the *Opium* being extracted with *Spirit of Wine*. But I had a *Laudanum*, of M. *Le Fevre* call'd *Laudanum Simplex*, of torrefy'd *Opium*, extracted with *distill'd Vinegar* and some other *Correctives*, which never *stupifies*, no, nor inclines to *Sleep* after 'tis taken, yet immediately *easeth* all *Pain*. I took it myself for 14 Days every Night in the *Bilious Colick*, which immediately eas'd the *Pains*, but perhaps I slept not till 2 or 3 *Hours* after; taking it with so much Security, that I very seldom weigh'd it, but guess'd at a Pill of 2 or 3, or even 4 *Grains*. Nor hath this *Laudanum Simplex* (by his Observation) only this Effect in the *Indies*, where I used it in all Cases to all Ages, even *Sucking Children*, but even here in *England* I gave it, not long ago, to a Lady in the *Colick Bilious*, never weighing it, and it eas'd her *Pains*; yet did she never apprehend, that she had taken any such thing, and all the Night if any did but stir, she could hear them as perfectly, as ever she could when she slept naturally.

The Observation which *Oviedo* hath about *Lice*, which is, That they leave the *Spaniards* as they go to the *Indies* in such a *Degree*, and meet them again in the same *Latitude* in their Return, is very true. For though the Ships we went in, with such a Multitude of Servants and Seamen, were not over cleanly, yet before we came to the *Tropick*, there were none *lowfy*; whereas before, one could not walk amongst them, but his Cloaths would gather *Lice*. In the *Indies* none are *lowfy*, how nasty soever, except it be in their *Heads*; and there they breed much. But in our Return home, I observ'd that they did multiply again, after we came to the *Latitude* of the *Madera's*. Sir *Christopher Mings* was of this Opinion, That when they approach the *Long-Reach* and *Tropick*, they begin to sweat excessively, which *Sweat* abounding over the Body, choaks the old *Lice* and kills them: Just thus, he said, it was an usual Remedy for *Lowfy* Heads to rub them all over with Butter or Oyl, and he would warrant it would kill all the *Lice*. And as for any new Generation, the *Sweat* not lodging in the Pores long enough, it was not dispos'd to produce those *Vermine* at all; for no *Sweat* in the *Indies* is rank, as in *Europe*, that ever he could observe. In their Return the *Sweat* lodgeth longer in the Pores and Habit of the Body, and the particular *Forms* or *Ferments*, being exalted and unloos'n'd, and put into Activity, shape out those Creatures, and so they breed them. But, if you ask, Why they breed in the Head in the *Indies*? He answers, That though our Faces sweat much, yet doth not our Hair so much: besides that, the *Sweat* is lodg'd in the Hair, and there breeds the *Vermine*, and they take not the Care of their Heads there as here, However the *Spanish Negroes*

groes wash their Heads with Soap once a Week to prevent being Lowfy, whilst the other Negroes lose a great deal of time in looking after their Heads; which by reason of their curls breed Lice more than the English, inasmuch, that he affirms to have seen great holes eaten by Lice in the Heads of some of them that were Lazy.

In the Colick Bilious we often used Clysters of Tobacco-Smoak, but with no Success at all. I also gave the Juice of Tobacco, an Ounce in a Clyster, which stupify'd extremely, but did no other good, than for the present to render them insensible of their Pain. It is usual to give Clysters of a Pint of Brandy there, which will make them as drunk and mad as if they had taken it at their Mouths: I observ'd that less Brandy would Fox them in a Clyster than if drunk by them. I try'd a quarter of a Pint in a Clyster on my self, and it made me, not Dead drunk, but raging Mad, (though mix'd with other things) my reason being deprav'd by these Fumes: So I never took more of that Clyster but once to reiterate the Experiment, the Effect being the same. But I comply'd with the Spanish Negroes, who to nourish me, gave me a Clyster of half a Pint of Madera-Sack, the Yolk of one Egg, and a little Pepper warm'd and given at Night, and to hold it in all Night: which did gently warm my Bowels, and cast me always into a gentle Sleep and Sweat for some Hours: I took many of these in the Day-time, the effect ceasing after 2 or 3 Hours.

I am of Opinion, that Chocolate, if it were well made and taken in a right way, is the best diet for Hypochondriacks and Coronical Distempers and the Scurvy, Gout, and Stone and Women Lying-in, and Children New-born (to prevent Convulsions and purge the Meconium out) and many other Distempers, that ever came into Europe: but 'tis now rather used for Luxury, than Physick, and so compounded as to destroy the Stomach, and to encrease Hypochondriacal Diseases.

The Chegoes breed commonly in the Negroes, yet no English get them, but by going in places frequented by them. They are incident most to such as are Nasty about the Feet; and very seldom any else have them. They will spread by little and little over the whole Feet, eat off Toes, and Over-run the whole Body of some Idle Negroes.

2. Alligators are snap'd like Lizards, being Four-footed they walk with their Belly at a distance from the Ground, like Lizards. Those of a full growth, have Teeth like a Mastiff, and a Mouths of 1¹/₂ Foot wide. They are of so strong a Scent, that you may Smell them at a pretty distance, when they lie on the Land. They may be master'd and kill'd by any, dextrous and skill'd in the Way of doing it, which is, that a Man be arm'd with a good long Trunchion, and fall upon them Side ways; for doing it Front-ways, they are too nimble for the Assailant, and may, by leaping upon him, (which they can do the Length of their whole Body) spoil him: but if he lay his Club on them against their Shoulder, and behind their Fore-feet, and lame them, they are easily Subdu'd.

Tortoises, if their Blood be beaten, Die: and if they shall Live, their Blood must not be hotter than the Element they Live in.

The

Some of these
Observations far-
ther consider'd;
by Mr Norwood,
Jun. n. 41.
p. 824.

The *Chegoes* are not felt to have got into the Body, till a Week after; they will breed in great Numbers, and shut themselves up in a Bag: which when you feel, there are certain skilfull Men, who with little Pain will take them out; having great care to take out the Bag Entirely, that none of the Brood (which are like *Nits*) may be left behind, for fear of giving rise to a New Generation.

The *Shining Flyes* are a kind of *Cantharides*, looking green in the Day-time, but glowing and *Shining* in the Night, even when they are *Dead*. I have apply'd them *Dead* to a printed and written Paper in the Dark, and read it.

The *Manchinel-Apple* is one of beautifullest Fruits to the Eye, of the agreeablest to the Smell, and of the pleasantest to the Taste (being thence call'd by many the *Eve-Apple*): but if eaten certain Death. The Wood of it yet green, if rubb'd against the Hand, will fetch off the Skin, or raise Blisters; and if any Drops of Rain, falling from this Tree, light upon one's Hand, or other Naked part of the Body, it will also have the aforesaid Effect.

Observations
made at the Bar-
badoes, by Dr.
Tho. Townshend
17. p. 339.

XI. At the *Barbadoes*, our general Draught of *Wine* is from the *Madera*, which, contrary to all other I know of, will not endure a Cool Cellar. *French* nor *Rhenish Wines* neither keep nor agree well with our Stomachs, if so constantly drunk as in *England*. *Canary-Wine* few here care for, counting it fulsome.

This Island is very *Temperate*, and the Sun, notwithstanding his Neighbourhood, is very Gentle, being fann'd with a constant Gale from the East.

I observe that *Purslane* is here all the Country over, where I have been, and even troublesome to the Planter: In the Fields I have many times gathered a Sallet of it, and it eats as well with Oyl and Vinegar as that of our *English* Gardens. Here is likewise a *Sonchus*, *Lens Palustris*: I found also a *Melilot*, or one so like it in all Circumstances (except that the Branches are not so erect) that I cannot find any difference from that of *England*.

The Springs here are all near the Sea: so that those who live up in the Country have no benefit of them. They made Ponds formerly to receive Rain; which served well enough, being kept cool by a broad leaved Weed and Ducks Meat, which overgrew most Ponds: But now almost every Sugar Plantation hath a Well, that gives very good Water.

The Soil is Fertile, though not above a Foot or two thick upon a white and spongy Lime-Stone-Rock; which affords good Quarries here and there that serve for Building. Every Dwelling-House, with the Sugar-Work, and other Out-housing, look like a handsome Town; most being new build with Stone, and cover'd with Pantile or Slate, brought hither in the Ballast of Ships, as are likewise Sea Coal for Forges, and so are brought cheap enough. Indeed the whole Island appears in a manner like a scattered Town, which
with

with the perpetual green Fields and Woods makes the place very pleasant.

The *Blood* of *Negroes* is almost as *black* as their *Skin*. I have seen drawn forth the *Blood* of at least 20, both Sick and in Health, and the Superficies of it all is as *dark*, as the bottom of any *European Blood* after standing a while in a Dish. So that the *blackness* of *Negroes* is likely to be *Inherent* in them, and not caused by the *Scorching* of the *Sun*, especially seeing that other *Creatures* here, that live in the same *Clime* and *Heat* with them have as *Florid Blood* as those that are in a *cold Latitude*, viz. *England*.

XII. I never saw any *Sand* in the *Bermudas*, such as will grind *Glass*, or whet *Knives*, &c. as in *England*; but a Substance like *Sand*, though much Softer: Neither have we any *Pebble-Stones* or *Flints*.

An Observation on Bermudas, by Mr. R. Norwood. n. 30. p. 565.

XIII. There is an Island among the *Babama's*, which is call'd *New Providence*; where many rare Things might be discover'd, if the People were but encourag'd. 'Tis stor'd with variety of *Fish* and *Fowl*, and with divers sorts of *Trees*, and other *Plants*, whose Qualities are not yet known.

Observations in New Providence Bermudas and Virginia; by Mr. Rich. Stafford. 40. p. 793.

The *Inhabitants* here at *Bermudas* live some to an *Hundred Years* and something upwards; Many do live till they are nigh a *Hundred*, but few above. And when they *Die*, 'tis *Age* and *Weakness* that is the Cause, and not any *Disease* attends them. The general *Distemper* that is Yearly amongst us, is a *Cold*; and that is most gotten in the *hottest Weather*. The *Air* is here very sweet and pleasant. Our *Diet* is but ordinary, and the People generally poor; and I observe that poor People are most *Healthful*.

That *Weed* which we call *Poyson-weed*, grows like our *Ivy*. I have seen a Man who was so *poyson'd* with it, that the *Skin* peel'd off his *Face*, and yet the Man never touch'd it, only look'd on it as he pass'd by: but I have chew'd it in my Mouth, and it did me no Harm. It is not hurtful to all.

Here are *Spiders*, that spin their *Webs* betwixt *Trees* standing 7 or 8 *Fathoms* asunder: and they do their Work by *Spirting* their *Web* into the *Air*, where the *Wind* carries it from Tree to Tree. This *Web*, when finish'd, will snare a *Bird* as big as a *Thrush*.

We cover our Houses with the *Leaves* not the *Bark* of a *Tree*, which is the *Palmetto*: without which *Tree* we could not live comfortably in this Place. The *Leaves* of some of these *Trees* are 8 or 10 *Foot* long, and nigh as Broad.

'Tis reported, That in *Virginia* and upon the Coast of *Florida*, the *Indians* live to a very great *Age*; and that some of the People are of a *Gigantick Stature*, and stronger by far than others.

XIV. Sept. 2. 1699. We weigh'd at *Madera*, and were under the *Tropick* of *Cancer* by the 10th of the Month, at which time the usual Ceremony of *Ducking* from the *Tard's Arm* was perform'd on those that could not pay their *Tropick Bottle*. All this time we had a brisk and constant Trade-Wind,

A Voyage to New Caledonia in Darien, by Dr. Wallac. n. 262 p. 536.

Wind, which lasted 3 *Days* more, but afterwards we had it more *Variable* than is usual in that place of the Sea.

The 28th we made *Defeada*, a small high Island, about a *League* in Length and as much in Breadth; it is full of Trees, but uninhabited. Next Morning we were betwixt *Antego* and *Montserat*, belonging to the *English*. Their product is Sugar and Tobacco. We were in the Afternoon close by *Redonda*, a small Rock about a *Mile* long, inhabited only by *Noddies* and *Boobies*. When we were some *Leagues* from *Redonda*, we saw at the same time *Antego*, *Montserat*, *Redonda*, *Nieves*, *St. Christophers* and *Statia*.

The next Day (which was the 30th,) we came in Sight of *Santa Cruz* belonging to the *Spaniards*.

Oct. 2. We came into *Crab Island*, and sent some of our People a-shore, and took Possession of it in the *Company's* Name.

Oct. 4. We stood to the *Leeward*, hearing there was a Harbour there; and when we came we saw the *Danes* Colours flying on the Shore, for the Governour of *St. Thomas* (a small Island belonging to the *Danes*, and a *Free-Port*) had sent 14 Men and a Captain to take Possession of it in the King of *Denmark's* Name: But we found that we had taken Possession of the place before they came from *St. Thomas*. They gave in their Protest, yet seem'd to be glad enough of our Neighbourhood.

On the 8th we left this Place, and on the 17th made *Nosra Signora della Popa*, we lay aside there along the Coast, until the 3d Day of November, generally losing by Night what we had gain'd all Day. *Crab Island* is about 6 *Leagues* long, and in some places 5 broad; the Soil is very good. It is all full of Trees; all the South side is full of Bays very fit for Anchoring in; but the best of all is to the *Leeward*, where the *Dane* hoisted his Colours. It is call'd *Crab-Island*, from the Multitude of *Land Crabs* there.

Nov. 3. We anchor'd before *Golden Island*, and sent in our Pinnace to the Bay. The Natives had hoisted a White Flag in sign of Peace, and told us a great many Stories of Capt. *Swan*, Capt. *Davies*, and others, for they took us for *English*, by reason of our Red Fly; but we took no Notice of the Men they nam'd. At last they ask'd us our Business; we told them, We design'd to settle among them, and to be their Friends. They told us, we were very Welcome, and that by *Prediction* they had expected us these 2 Years; for they say, that 2 Years ago it was foretold them, That a People should come and live amongst them, that would treat them Civilly, and teach them good Manners. We convers'd some time with them, and after viewing the Harbour we came a-board.

The 4th we came into the Harbour of *Caledonia*: It is a most excellent one, for it is about a *League* in length from N. W. to S. E. It is about half a *Mile* broad at the Mouth, and in some places a *Mile*, and more farther in. It is large enough to contain 500 *Sail* of Ships. The greatest part of it is *Land-lock'd*, so that it is Safe, and cannot be touch'd by any Wind that can blow; the Harbour and the Sea make the Land that lie betwixt them a *Peninsula*. There is a point of the *Peninsula* at the Mouth of the Harbour,

Harbour, that may be fortify'd against a Navy. This Point secures the *Harbour*, so that no Ship can enter but must be within reach of their Guns. It likewise defends half of the *Peninsula*; for no Guns from the other side of the *Harbour* can touch it, and no Ship carrying Guns dares enter for the *Breast-work* at the Point. The other side of the *Peninsula* is either a Precipice, or defended against Ships by Shoals and Breaches, so that there remains only the narrow Neck that is not naturally fortify'd. In short it may be made impregnable, and there is Ground enough within it, if it were all cultivated, to afford 10000 Hogheads of *Sugar* every Year. The Soil is rich; the Air good and temperate, the Water is sweet; and every thing contributes to make it healthful and convenient. The Product of this Place, I mean in the *Harbour* and *Creeks* hereabouts, is *Turtle*, *Manatee*, and a vast variety of very good small Fish, from the bigness of a *Salmon* to that of a *Perch*. The Land affords *Monkeys* of different Sorts, wild *Deer*, *Indian-Rabbit*, wild *Hog*, *Parrots* of many kinds, *Parakites*, *Macaws*, *Pelicanes*, and a hundred more *Birds* we have got no Name to. There are moreover *Land-Crabs*, *Souldiers*, *Land-Turtle*, *Lizards*, *Guan-ha's*, *Cock-Lizards* and *Scorpions*: I had almost forgot *Partridges*, *Pheasants*, and a kind of *Turkey*. All the *Birds* in this Country are beautiful, but none of them that I could observe have any Notes. We have a *Monkey* a-board that chirms like a *Lark*, it will never be bigger than a *Rat*. This Place affords Legions of monstrous Plants, enough to confound all the Methods of *Botany* ever hitherto thought upon. Some of their Leaves exceed 3 Ells in Length, and are very Broad. Besides these Monsters, reduceable to no Tribe, there are here a great many of the *European* Kindred, (but still something odd about them) as *Lingua Cervina* of different Kinds, *Polypodium*, several of the *Plantæ Papilionaceæ*, *Musci*, *Fungi*, *Convolvuli*, and a great many more I cannot now remember.

Now come we to their People. The Men are generally very civil and sagacious, have all of them good Faces, are of low Stature, but very well built; they are of a Copper-Colour, and have black Hair; they us'd to go naked, but are now as well cloath'd as our selves; they wear a Plate of Gold in their Nose, and a great many Rows of Beads about their Neck and Wrists.

The Women are generally the most pitiful-like things that ever Man saw; their Habit differs from the Men, for they ordinarily wear a Ring in their Nose; they have Petticoats, and a Vail over their Face. They are under no formal Government, but every Captain commands his own River, Bay or Island where he lives; the greatest of them all is one Capt. Ambrosio, he commands particularly the Country about the Cambaloes Point, and when he pleases, he can levy all the Men betwixt that and the Gulf, about 20 Leagues. There is another Capt. Pedro, that lives in the House with Ambrosio, and is his Nephew and Son-in-Law: there is a 3d Capt. Andreas, that commands the River das Armas; a 4th Capt. Brandy, that commands about the Golden Island; a 5th Capt. Andreas that commands the Country adjoining to our Settlement; and a 6th Capt.

Pedro his Consort ; a 7th Capt. *Pacigo*, who commands at *Carret Bay*, and Capt. *Diego* that commands the *Gulph*. *Ambrosio* seems to be the greatest, and *Diego* next ; both old Men.

There is no such thing as a *King* or *Emperour* of *Darien*, nor, so far as we can gather from all the chief Men here about, has been these 40 or 50 Years.

This Country certainly affords *Gold* enough, for besides that the Natives constantly assure us, that they know several *Gold-Mines* on this side ; besides that, I say, the *Plates* they wear in their *Noses*, and the Quantity of *Gold* that is amongst them, is enough to perswade any Man of the Truth of it. There was one Night a-board here some *Indians* that had a hundred *Ounces* of *Gold* about them. We are certainly much bound to Providence in this Affair ; for as we were searching for the Place we were directed to, we found this, and tho' the Privateers had been so often at *Golden Island*, and though *English*, *Dutch* and *French* had been all over this Coast, from *Portobello* to *Cartagena*, yet never one of them made the Discovery, even the *Spaniards* themselves never knew of this Place.

Observations in
Mexico ; by ...
n. 130. p. 758.

XV. There were formerly near 80 *Towns* seated round about the *Lake* of *Mexico*, some of which contained 5000 *Families*, and some above 10000. At the present there may be a matter of 30 *Burroughs* and *Villages*, of which the greatest holds not above 500 *Houses* ; all the rest having been ruined by the *Revolutions* in that Country.

Observations in
New-England ;
by Mr. J. Win-
throp. n. 57. p.
1151.

XVI. 1. There is in *New-England* in the Inland Country whole Forests of a sort of *Dwarf Oak*, which though low and slender yet bears *Acorns*. The Husbandmen find that sort of Land most difficult to break up at first with their Plough, in regard that the whole Surface is fill'd with spreading strong Roots of this sort of *Oak*. Neither must it be thought, that they are small Shoots, which in time would grow big Trees ; for, where these grow there are no great *Oaks*, or very few, amongst them. I have observed that in some Plains, full of these *Shrubs*, there have been no *Acorns* on most of them ; but whether in other Years they were not fruitful, I knew not. Some Years, we know, even the great *Oaks* bear no Fruit, which are very full at other times.

Upon the *Bark* of a certain Tree growing in *Nova Scotia*, and (as I hear) in the more Easterly Parts of *N. England*, there are little Knobs, within which there is a liquid Matter like *Turpentine* (which will run out, the Knob being cut open) of a very *Sanative* Nature, as I am credibly informed.

The *Pods* of *silk Grass* are full of a kind of most fine *Down* like *Cotton-Wool*, many such Flocks in one and the same Pod ending in a flat Seed. 'Tis used to stuff up Pillows and Cushions ; being tryed to Spin, it proves not strong enough.

The *Down* also of the *Cotton-Tree* is not fit to *Spin*. These *Trees* grow high and big. At the bottom of some of the *Leaves*, next to the *Stalk* of them, is a *Knob* which is hollow, and a certain *Fly*, somewhat like a *Pismire-Fly*, is bred therein.

Those *Shells*, of which the *Indians* make the *white Wampan-peage*, one sort of their *Money*, are bred in *Matrices* growing on the bottom of *Sea-bays*. They are like *Periwinkles*, but greater. Whilst they are very small, and first growing, many of them are within one of the *Concave Receptacles* of these *Matrices*, which are very tough and strong, so contrived, that they are separate from one another, yet so, that each of them is fastened to a kind of *Skin*, subtended all along to all these *Cases* or *Bags*.

2. The *Plague of the Back* is greatly distant from an *Emphyema*. It seems more of a *Colick*, yet is undoubtedly a *Nervous Dolour*. The Country People have learned of the *Indians* to steep *Castoreum* in *Rum*, and so cure it.

By Mr. Benj.
min Bullivant, 24
24^o p. 167.

As to the *Fire-Flies*, I took several of them in *July 1697*. I take them to be a *Glow-Worm Volant*; the *Luster* is placed as in a *Glow-Worm*. Kill the *Fly* (as I have done) and you'll find the *Scintilla* a small *Jelly-like Substance*, the which separated into *Atoms*, gives still, in the dark, a *Luster* proportionable to the *Magnitude* of each *Atom*.

I saw *Butter flies-Eggs* that were *Tessaceous*, and near as big as a *Wren's*, most gloriously bespotted with *Gold* and *Silver*; at *Road-Island* the *Mowers* find them in the *Grass*, and they hatch in the *Windows* and are a *Sport* for *Children*.

Tortoises are *Amphibious*, I have found their *Eggs* by *Ponds* sides, in great *Quantities*; they are without *Shells*, like those in a *Hen's Belly*; our *Dames* scruple not to use them as *Hen's Eggs* in *Puddings*.

Grasshoppers in dry *Years*, are a *Plague* to the *Husbandmen*: That on some *Islands* they have put multitudes of *Turkeys* to destroy them; they are prodigious in *Quantity*, of a grey *Colour*, and about 3 *Inches* long; in *July* become *Volant*, and have a kind of *Regimental Discipline*, and as it were, some *Commanders* which shew greater and more splendid *Wings* than the *Commoners*, and rise first when they are pursued by the *Fowls*, or by the *Foot* of the *Travailer*.

The *Hum-bird* I have shot with *Sand*, and had one some *Weeks* in my keeping. I put a *Straw* for a *Perch* into a *Venice Glass Tumbler*, tyed over the *Mouth* with a *Paper*, in which I cut *Holes* for the *Bird's Bill* (about as long and as small as a *Taylor's Needle*) and laying the *Glass* on one side, set a *Drachm* of *Honey* by it, which it soon scented, and with its long *Tongue* put forth beyond its *Bill* fed daily; it muted the *Honey* pure.

We have a *Frog* as big as a *Penny Loaf*, it cries exactly like a *Bull*. I have examined the *Clam*; he hath a *plain Pipe* or *Probojicis*, from whence he ejects *Water*, if compressed.

*The Advantage
of Virginia for
Building Ships;
by
n. 39. p. 6015.*

XVII. *Virginia* abounds all over, 1. With large tall Oaks of at least 50 or 60 Feet in Height of clear Timber, without Boughs or Branching; being very fit to make Plank of any size, very tough and excellently well enduring the Water.

2. With abundance of Pines for Masts; and with another sort of Wood call'd Cypress, which is far better than any Pine for Masts; it being of as tough and springy a Nature as *Tew Tree*, bending beyond Credit; when dry much lighter than Firr; and so well lasting in Wet and Dry, that it seems rather to polish than perish in the Weather.

3. With old Pines for making of Rosin, Pitch and Tar.

4. With the Conveniency of planting Hemp for Cordage and Sail-Clothes.

5. With great Plenty of Iron-Stone, which hath been try'd and found very good; the Conveniency of Wood and Lime-Stone being a good Inducement to the making of Iron, which might be done at a much cheaper Rate there than in England.

*An Account of
Virginia, by Mr.
Thomas Glover.
n. 126. p. 623.*

XVIII. *Virginia* being a part of the Continent of *America*, is distant from the Lizard or Lands-End of England 1000 Leagues, and is bounded on the East with the main Ocean, on the West with the Appal-lean Mountains, on the North with *De-la-ware's Bay* and River, and on the South with the River of *Roanoak*; the Country lyeth within a Bay called the Bay of *Chise-peek*; the Mouth or Entrance whereinto is due West, being about 6 Leagues in Breadth, and runneth up into the Country North and by East about 100 Leagues, continuing the forementioned Breadth a great part of the way, but narroweth by Degrees towards the upper end about one Half. The Water in the Channel is for the most part 9 Fathom, but in some Places not above 7. The Southernmost Cape of this Bay lieth in 37 Deg. and odd Min. North Latitude; and within the same are divers little Islands, upon some of which there are Plantations.

Into this Bay do issue so many large, pleasant and commodious Rivers, as I verily believe no space of Ground of equal Dimensions in the whole World can boast of the like: The most eminent of these are, *James River*, *Tork*, *Rapahannock*, *Potomack*, *Potuxen* and *Choptanck*; the four last retain their Indian Names. At the Head of the Bay do enter 3 large Rivers; one whereof is call'd *Suf-cabannah*, from a Nation of Indians so call'd, bordering on the same. Besides these there are twice as many, as navigable as these, but by Reason they run not above 30 or 40 Miles, I shall forbear inserting any of their Names.

Potomack, the largest of all the rest, is at the Mouth 10 Miles broad, and continueth that breadth for 20 Miles up; from which Place it is 6 Miles Broad, and continueth that Breadth for 30 Miles higher, and is in Length about 200 Miles. This River lyeth about the middle of the Bay: The other Rivers whose Names are here inserted, are most of them 2 Leagues Broad at the Mouth, and some of them 150, others 120 Miles in Length.

The *Tides* are scarce discernable, when the Winds hold at *North-West*; but at other times they flow as they do in *England*, only they appear not so Large; the reason whereof may be, because the *Tide* diffuseth it self into so many spacious Rivers.

In the Rivers are great plenty and Variety of delicate *Fish*; one kind whereof is by the *English* call'd a *Sheep's-head*, from the resemblance the Eye of it bears with the Eye of a *Sheep*: This *Fish* is generally about 15 or 16 *Inches* long, and about half a *Foot* broad; it is a Wholesome and Pleasant *Fish* and of easy Digestion.

There is another sort which the *English* call a *Drum*; many of which are 2 *Foot* and a half or 3 *Foot* long. This is likewise a very good *Fish*, and there is great plenty of them. In the Head of this *Fish* there is a Jelly, which being taken out and dry'd in the Sun, then beaten to powder and given in Broth, procureth speedy *Delivery* to *Women in Labour*.

At the Heads of the River there are *Sturgeon*, and in the *Creeks* are great store of small *Fish*, as *Perches*, *Crokers*, *Taylors*, *Eels*, and divers others whose Names I know not. Here are such plenty of *Oysters* as they may load Ships with them. At the Mouth of *Elizabeth* River, when it is Low-water, they appear in Rocks a *Foot* above Water. There are also in some places great store of *Muscles* and *Cockles*; there is also a *Fish* call'd a *Sting Ray*, which much resembleth a *Skate*, only on one side of his Tail grows out a sharp bone like a *Bodkin* about 4 or 5 *Inches* long, with which he Strikes and wounds other *Fish*, and then preys upon them.

About a Year before I came out of the Country, as I was coming down *Rapahannock* River in a Sloop bound for the Bay, 3 *Leagues* short of the River's Mouth, being left alone in the Sloop, I heard a great Rushing and Flashing of the Water, which caus'd me suddenly to look up, and about half a Stone cast from me appear'd a most prodigious Creature, much resembling a *Man*, only somewhat larger standing right up in the Water, with his Head, Neck, Shoulders, Breast and Waste to the cubits of his Arms, above Water. His Skin was tawny, much like that of an *Indian*; the Figure of his Head was *Pyramidal*, and slick, without Hair; his Eyes large and black; and so were his *Eye-brows*; his Mouth very wide, with a broad black Streak on the upper-Lip, which turn'd Upwards at each end like *Mustachoes*; his Countenance was grim and terrible; his Neck, Shoulders, Arms, Breast and Waste, were like unto the Neck, Shoulders, Arms, Breast and Waste of a *Man*; his Hands, if he had any, were under Water; he seem'd to stand with his Eyes fix'd on me for some time, and afterward dived down, and a little after he rose at somewhat a farther distance, and turn'd his Head toward me again, and then immediately falleth a little under Water, and swimmeth away so near the top of the Water, that I could discern him throw out his Arms, and gather them as a *Man* doth when he swimmeth. At last he shoots with his Head downward, by which means he cast his Tail above the Water, which exactly resembled the Tail of a *Fish* with a broad *Fin* at the end of it.

On the *Bay* and *Rivers* feed so many *Wild-Fowl*, as in *Winter-time* they do in some places cover the *Water* for 2 *Miles*; the chief of which are wild *Swans* and *Geese*, *Cormorants*, *Brants*, *Shield-fowl*, *Duck* and *Mallard*, *Teal*, *Wigeons*, with many others.

There likewise keep in the *Rivers* *Bever*s and *Otters*: the *Bever*s have their *Teeth* so strong and sharp, that they gnaw down *Trees*, wherewith they make *Damms* cross the *Water* under which they keep, which are usually call'd *Bever-Damms*, and in some places serve in the Room of *Foot-Bridges*.

The Original *Springs*, that make all these *Rivers*, arise at the *Foot* of the *Appal-lean Mountains*; but the *Cataracts* or *Falls* of these *Rivers* are 60 or 70 *Miles* distant from the *Mountains*.

These *Mountains* have their beginning *Northward* at the *Lake* of *Canada*, and run all along the *Back* of the *Country* to the *South-west* as far as the lake *Usherre*, which is some *Hundreds* of *Leagues*.

There was one *Coll. Catlet*, that was a good *Mathematician*, who with some other *Gentlemen* took a *Journey* to make further *Discoveries* of the *Country* to the *Westward*, and arriving at the *Foot* of the *Mountains* early in the *Morning*, they left their *Horses* and endeavour'd to gain the *Tops* of the *Mountains*, which they accomplish'd about 4 of the *Clock* in the *Afternoon*, and then looking further forward, they discover'd other *Mountains*, whereof they took the *Altitude* and judg'd them inaccessible; which discourag'd them from any further *Attempts*.

Above 5 *Years* since there was a *German Chirurgeon*, who obtain'd a *Commission* from *Sir Will. Bartlet* to travel to the *South West* of *Virginia*, and to make *Discovery* of those *Parts*. He went along the *Foot* of the *Mountains* as far as the *Lake Usherre*, and discover'd them to be *Passable* in two *Places*; and he gives a *Relation*, that while he was in an *Indian Town* adjacent to the *Mountains*, there came 4 *Indians* on an *Embassy* to the *King* of that *Town*, from a *King* that lived on the other side of the *Mountains*.

At his return he brought an *Emerald*, and some *Spanish Money*, which he said he had of the *Indians* bordering on the *Lake* of *Usherre*; which caused some to think that some *Spaniards* are seated near upon the *Back* of these *Mountains*.

The *Shores* all along the *Bay* and *Rivers* are for the most part *Sandy*, but only in some *Points* there is some *Shingle* cast up; but the *Earth* affordeth very few *Stones*, and those that are there, are almost all of them hard and *Transparent*. I have taken up several *Stones*, that would cut *Glass* as well as any *Diamond*: And I do verily think, that there are some *Stones* gather'd there that do abate the *Price* of *Diamonds*; for I have seen several *Rings* of *Virginia-Stones*, which in my *Judgment* have equall'd *Diamonds* in *Lustre*.

The *Cliffs* of all the *Rivers* are full of great *Veins* of *Iron-Mine*, and in some *Places* of the *Country* I have seen *Rocks* of the same to lie a *Foot* above the *Earth*; and generally all the *Highlands* under the *Mould* are a
mere

meer Rock of *Iron*: But an *Iron-work* would cost 3000 l. and the Country being generally Poor, they were discouraged from running this *Mineral* by reason of the Charge: Tho' I believe the true reason is, their being so intent on their *Tobacco-Plantations* that they neglect all other more noble and advantageous Improvements.

They distinguish their *Soil* into three sorts, viz. *High, Low* and *Marshy* Land; all which have some *Sand* mixed in them, that makes their Land warmer than ours in *England*. Their *High-Lands* are most *Sandy*, but do notwithstanding bear very good Crops of *Tobacco*; only it does not hold its strength so long as the *Low Ground*, which is very rich, being a blackish Mould about a *Foot* deep, or somewhat more, and will hold its strength for 7 or 8 crops successively without *Manuring*. Their *Marsh Lands* bear *Sedges* and *Rushes* after the manner of ours; and of these they have not endeavoured any Improvement as yet. Their Land in general is as good and fertile as the Land of *England*. When the strength of their Ground is worn out, they never *Manure* it to bring it in Heart, but let it lie for Pasture for all Mens Cattle to graze upon, and clear more Ground out of the Woods to Plant in.

As to the *Timber* of this Country, there are divers kinds, four several sorts of *Oak*, very tall and smooth. There is also another sort of *Timber* call'd *Hickery*, that is harder than *Oak*. There are also very large and tall *Poplars*, and in some parts of the Country great store of *Pines* fit for *Masts of Ships*. There is likewise *Black Walnut*, *Cypress*, *Cedar*, *Dogwood*, *Ash*, *Elm*, *Gum-Tree*, *Locust*, *Chestnut*, *Hazel*, *Sassafras*, *Holly*, *Elder*, with several others.

As to the *Fruit Trees* of the Country, it affords great plenty: For there are few *Planters* but that have fair and large *Orchards*, some whereof have 1200 Trees and upward, bearing all sorts of *English Apples*, as *Pear-mains*, *Pippins*, *Russetins*, *Costards*, *Marigolds*, *Kings-Apples*, *Magitens*, *Bat-belours*, and many others, of which they make great store of *Cider*.

Here are likewise great *Peach-Orchard*, which bear such an infinite quantity of *Peaches*, that at some *Plantations* they beat down to the Hogs forty *Busbels* in a *Tear*.

Here are also great store of *Quinces*, which are larger and fairer than those of *England*, and not so harsh in Taste; of the Juice of these they make also *Quince-drink*.

Here are likewise *Apricocks*, and some sort of *English Plums*, but these do not ripen so kindly as they do in *England*.

There are some sort of *Pears*; but at very few *Plantations*; I have seen the *Bergamy*, *Warden*, and 2 or 3 other sorts, and these are as Fair, large, and pleasant as they are in *England*.

Here grow as good *Figs*, as there do in *Spain*, but there are few planted as yet.

Those that take the pains to plant *Goose-berries*, have them; but I never saw any of our *English Currants*, (*Ribberies*) there: and it is observed, that *Oranges* and *Limons* will not grow there, though they do in more Northern Countries.

I had almost forgot to mention their *Mulberry-Trees*, whereof they have good store about their Houses; these were planted at first to feed *Silk-Worms*; but that Design failing, they are now of little use among them.

The meanest *Planter* hath store of *Cherries*, and they are all over *Virginia* as plentiful as they are in *Kent*. The *Cherry-Trees* grow more large generally than they do in *England*, and bear more plentifully without any pains taking of *Digging* about them, or *Pruning* them.

There groweth wild in some places of the Woods a *Plum* somewhat like our *White Plum*, but it doth exceed it, being much more Succulent.

In the Woods there are abundance of *Vines*, which twine about the *Oaks* and *Poplars*, and run up to the Top of them; these bear a kind of *Claret-Grapes*, of which some few of the *Planters* do make *Wine*, whereof I have tasted: it is somewhat smaller than *French Claret*; but I suppose, if some of these *Vines* were planted in convenient *Vineyards*, where the Sun might have a more kindly Influence upon them, and kept with diligence and seasonable *Pruning*, they might afford as good *Grapes* as the *Claret Grapes* of *France* are.

There is also in the Woods a little *Shrub* which beareth a *Berry* like our *Elder-Berry*, and it is a very pleasant *Berry* to eat.

Here is a *Tree* call'd a *Chincopine*, which is like a *Chestnut*, with a *Burry Husk*, but less by far.

Their *Gardens* have all sorts of *English Pot-Herbs* and *Sallets*; they have *Cabbages*, *Coleworts*, *Colly Flowers*, *Parsnips*, *Carrots*, *Patatoes*, and *Tams*; and such *Herbs* as grow wild in *England*, and do not grow there, they plant, as *Wormwood*, *Fetherfew*, *Honfselek*, *Carduus Benedictus*, *Rue*, *Coriander*, *Enula*, and the like.

They have likewise in their *Gardens* *Roses*, *Clove-Gilliflowers*, and variety of other sort of *Flowers*.

There grow wild in the Woods *Plantane* of all sorts *Tellow-Dock*, *Burdock*, *Solomons-Seal*, *Egrimony*, *Centory*, *Scabious*, *Ground-sell*, *Dwarf Elder*, *Tarrow*, *Purslain*, and *White Muiden-Hair*, the best that ever I saw. Upon the sides of the Hills, *Asarum*; and on the Bay-side, *Soldanella* or *Sea-Scurvygrass* in great Plenty. Here groweth the *Radix Serpentaria Nigra*, which was so much used in the last great *Pestilence*, that the price of it advanc'd from 10 *Shillings* to 3 *Pounds Sterling* a *Pound*: Here is also an *Herb* which some call *Dittany*, others *Pepper-wort*; it is not *Dittany* of *Candia*, nor *English Dittander*; it groweth a *Foot* or a *Foot and half* high, the *Leaves* are about the Breadth of a *Groat*, and Figured like a *Heart*, and shoot out of the *Stalk* and *Branches* one of a side directly Opposite to each other; it smelleth hot like *Pepper*, and biteth upon the *Tongue*. The *Water* of this *Herb* *Disfilled* out of a *Limbeck*, is one of the best Things I know to drive *Worms* out of the *Body*; and an *Ounce* of this *Water* taken, provoketh *Sweat* plentifully.

Here grow two *Roots*, which some *Physicians* judge the one to be *Tur-lith*, the other *Mechoacan*; but whether they be the right or no, I could not well judge. Both these *Roots* are *Purging*, and in their *Operations* much

much like those we have at the *Apothecaries*, only somewhat more forcible; the Reason may be, because there we have them more New and Succulent.

Here groweth a Plant about a *Foot* and a half or two *Foot* in Heighth; the *Leaves* are rugged like to a *Borage* Leaf, but they are longer, and not above 2 *Fingers* broad; about the *Stalk*, where the *Leaves* grow out, there hang *Berries*, which being Ripe are *Tellow*; the *English* call it the *Fever* and *Ague* Root. This Root being newly taken out of the Ground, and a *Dram* and a half of it intus'd in Beer or Water the space of 12 *Hours*, purgeth downwards with some Violence, but I have given a *Dram* of the Root in Powder, and then it only moveth *Sweat*, and that but moderately. It is a little bitter in Taste, and therefore somewhat hot.

All that the Inhabitants give their *Cattle* in Winter is only the Husks of their *Indian* Corn, unless it be some of them that have a little *Wheat* Straw; neither do they give them any more of these than will serve to keep them alive, by Reason whereof they venture into the marshy Grounds and *Swamps* for Food, where very many are lost.

They have as great plenty of *Horses*, and as good, as we have in *England*.

As to their *Sheep*, they keep but few, being discourag'd by the *Wolves*, which are all over the Country, and do much Mischief amongst their Flocks.

In the *Woods* are great store of *Deer*, and some *Rabbits*, which are generally mistaken for *Hares*.

There are also several Sorts of ravenous Beasts, as *Wolves*, *Racoons*, *Wild-Cats*, *Possums*, *Monacks*, flying *Squirrels*, with two other Sorts; and in the Northernmost Parts of the Country some *Bears*.

The *Fowls* that keep the *Woods* are wild *Turkies*, *Turkey Buzzards*, *Turtle-Doves*, *Partridges*, *Hawks* of several Sorts, with many other of less Note.

There are also divers Kinds of *Small-Birds*, whereof the *Mocking-Bird*, the *Red-Bird* and *Humming Bird*, are the most Remarkable; the first for Variety and Sweetness of Notes, the second for his Colour, and the last for the Smallness of his Body. As to the *Mocking-Bird*, besides his own natural Notes, which are many and pleasant, he imitates all the *Birds* in the *Woods*, from whence he takes his Name; he singeth not only in the Day, but also at all Hours in the Night, on the Tops of the Chimneys; he is strangely antick in his Flying, sometimes fluttering in the Air with his Head right down and Tail up, other times with his Tail down and Head up; being kept Tame, he is very docible. The *Red-Bird*, as I hinted before, taketh his Name from the Colour, being all over of a pure Blood-Red. The *Humming-Bird* taketh his Name from the Noise he makes in flying: This is of divers Colours, and not much bigger than a *Hornet*, and yet hath all the Parts of a *Bird* entire.

There are 5 or 6 Sorts of *Snakes*, amongst which the *Rattle-Snake* is most Remarkable, being about the Bigness of a Man's Leg, and for the

most part, about a *Tard* and a half long; he hath a *Rattle* at the end of his *Tail*, wherewith he maketh a *Noise* when any one approacheth nigh him, which seemeth to be a peculiar *Providence* of *God* to warn People to avoid the Danger; for this Creature is so *venemous*, that the Bite of it is of most dangerous Consequence, unless they speedily make Use of the proper *Antidote*. There are also long *black Snakes*, short and thick *black Snakes*; this latter Sort oftentimes sucks the *Cows*, and causes them to give bloody *Milk*. There is another Sort is call'd the *Corn-Snake*, because he is usually found in *Corn-Fields*; this is near as big as the *Rattle-Snake*. There are also some other Sort of *Land-Snakes*, all of which are, more or less *Venemous*; besides, there are very many *Water-Snakes*, that keep the *Springs* and *Rivers*.

The *Indians* are generally well proportion'd as to their *Stature*, being somewhat Tall, but no ways Corpulent; their Hair black, usually hanging right down; their Eyes also black, and their Skin tawny, inclining to Blackishness. They live together in *Towns*, and every *Town* is under a several *King*. At the first coming of the *English* divers *Towns* had 2 or 3000 *Bow-men* in them; but now, in the Southern Parts of *Virginia*, the biggest *Indian Town* hath not above 500 *Inhabitants*; many *Towns* have scarce 60 *Bow-men* in them, and in one *Town* there are not above 20; and they are so universally thinn'd in the fore-mention'd Southern Parts, that I verily believe there are not above 3000 left under the whole Government of *Sir Will. Bantlet*; but in my Lord of *Baltimore's Territories* at the Head of the *Bay*, where the *English* were later seated, they are more numerous, there being still in some *Towns* about 300 *Indians*. But these being in continual Wars with each other, are like shortly to be reduc'd to as small Numbers as the former.

Instead of *Clothes* they wear a *Deer-Skin* tuck'd about their Middle, and another about their Shoulders, and for *Shoes* they have pieces of *Deer-Skin* ty'd about their Feet.

Their Habitations are *Cabins*, about 9 or 10 Foot high, which are made after this manner: They fix *Poles* into the Ground, and bring the Tops of them one with another, and so tye them together; the Outside of these *Poles* they line with *Bark* to defend them from the Injuries of the *Weather*, but they leave a Hole on the Top, right in the middle of the *Cabin* for the *Smoak* to go out. Round the Inside of their *Cabins* they have *Banks* of *Earth* cast up, which serve instead of *Stools* and *Beds*. They have no kind of *Household-stuff* but *Earthen Pots*, *Wooden Bowls*, and thin *Matts* to lie on; all which they make themselves.

Their Diet is *Indian Corn*, *Venison*, *wild Turkeys*, *Oysters*, and all kind of *Fish* the *Rivers* afford; and all kind of *wild Beasts* of the *Woods*.

They are prohibited the keeping either *Cows*, *Sheep* or *Hogs*, by the *English*, lest they should make bold with more than their own.

They did formerly catch their *Fish* after an odd manner before the *English* came amongst them, which was thus: At the Head of their *Canocs* they fix'd a *Hearth*, on which in a dark Night they would make a *Blaze* with

with *Fire* put to the Shivers of Pine-Tree ; and they would *Paddle* their *Canoes* along the Shoar in Shoal-water ; the *Fish* seeing the *Light* would come as thick as they could swim by each other, about the *Head* of the *Canoes* ; then with Sticks that were pointed very sharp at the Ends, they would strike through them and lift them up into the *Canoe* : But now they have learn'd of the *English* to catch *Fish* with *Hook* and *Line*, and sometimes the *English* do use their Way in dark Nights, only they strike with an Instrument of Iron somewhat like *Mole-Tines*.

They have *Priests*, which are generally thought to be *Conjurers* ; for when they have great want of *Rain*, one of their *Priests* will go into a private *Cabin*, and by his *Invocations* will cause *Abundance* to fall immediately, which they call *making of Rain*.

They offer the *First-Fruits* of all things ; the *first Deer* they kill after they are in Season, they lay privately on the Head of a Tree near the Place where they kill it, and they say, no *Good-Luck* will befall them that Year if they do not offer the *First* of every thing.

They burn the Bodies of the *Dead* ; and sew up the *Asbes* in *Matts*, which they place near the *Cabins* of their *Relations*.

Some of them say, That the *God* of the *English* is a good *God*, and gives them good Things ; but *their God* is an *angry God*, and oftentimes beats them.

Almost every *Town* differs in *Language*, and yet not any of their *Languages* copious ; as may be seen by their frequent expressing their Meaning to each other by *Signs*.

Their *Money* is of two Sorts ; one whereof is made of a *White* kind of *Shell*, which being divided into small Parts, they put them on a *String* after the manner of *Beads* ; this they call *Peacke* : The other is of a *Blue Shell* order'd in the same manner, which they call *Rounda* ; this last is the meaner Sort, about half a *Tard* whereof is of equal Value with our *Nine Pence*. The *Chief* of the *Indians* do wear some of this on the *Deer Skins* about their Bodies, laid on like *Lace*.

They have nothing to *tradewith* but *Deer Skins*, and some *Bever*, which they exchange with the *English* for *Guns*, *Gun-powder*, *Shot* and *Brandy* ; having nothing before but *Bows* and *Arrows*, wherewith they kill'd their *Deer* and other *wild Beasts*.

They have no other Account of *Time*, but by the *Changes* of the *Moon*.

Their *Winter* is usually in *November*, *December* and *January*.

They are very *revengeful* ; for, if any one chance to be slain, some of the *Relations* of the slain Persons will Kill the *Murtherer* or some of his *Family*, though it be 2 or 3 *Generations* after, having no *Justice* done amongst them in this respect but what particular Persons do themselves ; if that may be term'd *Justice*.

The *Indians* being a rude sort of People use no *Curiosity* in preparing their *Physick* ; yet are they not *Ignorant* of the *Nature* and *Uses* of their *Plants* ;

Plants, but they use no *Correctives* to take away the *Flatuous*, *Nauseous*, and other bad *Qualities* of them.

Their usual way of *Cure* for most *Inward Distempers* is by *Decoction*, which they make partly *Pectoral* partly *Sudorifick*; these they cause the *Sick* to drink, the quantity of *half a Pint* at a time, two or three times a *Day*; but they give nothing to procure *Vomiting* in any *Distempers*, as a bad *Omen* that the *Deceased* will *die*; neither did I ever know them to use any ways of *Bleeding* or *Cupping*.

If they have any *wounds*, *Ulcers* or *Fractures*, they have the *Knowledge* of *Curing* them. I did once see an *Indian* whose *Arm* had been *broken*, and viewing the place I found the *Bones* to be as *smoothly consolidated*, and as well *reduced*, as any *English Chirurgeon* could have done it.

All *Indians* carry a *Powder* about them, to *cure* the *Bites* of *Snakes*, and in almost every *Town* this *Powder* hath a *Different Composition*, and every *Composition* is certainly effectual to the correcting the *Malignity* of the *Venom*. Neither was it ever known to us, that any *Indian* suffered much harm by these *Bites*, but in a *Day's* time he would be as well as if he had never been *bitten*: Whereas some of the *English* for want of a speedy *Remedy* have lost their *Lives*.

The *Indians* are frequently troubled with violent *Colicks*, which often times terminate in *Palsies*.

The manner of *Planting* and *ordering Tobacco* is thus: In the *Twelve Days* they begin to *Sow* their *Seed* in *beds* of fine *Mould*, and when the *Plants* be grown to the breadth of a *Shilling*, they are fit to *Replant* into the *Hills*; for in their *Plantations* they make small *Hills* about 4 *Foot* distant from each other, somewhat after the manner of our *Hop-yards*. These *Hills* being prepared against the *Plants* be grown to the foremention'd *Bigness* (which is about the beginning of *May*;) they then in moist *Weather* draw the *Plants* out of their *Beds* and replant them in the *Hills*, which afterwards they keep with diligent *Weedings*. When the *Plant* hath put out so many *Leaves* as the *Ground* will nourish to a *Substance* and *Largeness* that will render them *Merchantable*; then they take off the *Top* of the *Plant*: If the *Ground* be very rich, they let a *Plant* put out a *Dozen* or 16 *Leaves* before they *top* it; if mean, then not above 9 or 10, and so according to the strength of their *Soil*. The *Top* being taken off, the *Plant* grows no higher: but afterwards it will put out *Suckers* between their *Leaves*, which they pluck away once a *Week*, till the *Plant* comes to *Perfection* which it doth in *August*. Then in dry *Weather*, when there is a little *Breeze* of *Wind*, they cut down what is ripe, letting it lie about 4 *Hours* on the *Ground*, till such times as the *Leaves*, that stood strutting out, fall down to the *Stalk*, then they carry it on their *Shoulders* into their *Tobacco Houses*, where other *Servants* taking of it, drive into the *Stalk* of each *Plant* a *Peg*, and as fast as they are *Pegg'd*, they hang them up by the *Pegs* on *Tobacco-Sticks*, so nigh each other that they just touch, much after the manner they hang *Herrings* in *Turmonth*; thus they let them hang 5 or 6 *Weeks*, till such time as the *Stem* in the middle of the *Leaf* will snap in the
Bending

tending of it; then, when the Air hath so moisten'd the *Leaf* as that it may be handled without breaking, they strike it down, *Strip* it off the *Stalk*, bind it up in Bundles, and Pack it into *Hogheads* for use.

Sometimes they are forced to *Plant* their *Hills Twice* or *Thrice* over by reason of an *Earth-Worm* which eats the *Root*: and when the *Plant* is well grown, they suffer damage by a *Worm*, that devours the *Leaf*, call'd a *Horn-Worm* (an *Eruca* or *Caterpillar*) which is bred upon the *Leaf*; if these *Worms* being not carefully taken off, they will spoil the whole *Crop*.

In the *Tear* 1667, in *August*, there happen'd all over *Virginia* a *Gust* or storm of *Wind* and *Rain*, which continued for 3 *Days* with such *Violence* that the like was hardly ever heard of: it began and continued blowing at *East* with such *Fierceness*, that above one half of the *Crop* of their *Tobacco*, which was then standing in their *Fields*, was blown away and Torn apieces; the *Trees* in the *Woods* all over the *Country* were blown up by the *Roots* in an *Innumerable Quantity*: The *Waters* in the *Bay* in some *Places* were drove a great way into the *Woods*, and the greatest part of those that housed *Tobacco*, had their *Tobacco Houses* blown down, and their *Tobacco* spoil'd; so that there was not fully one part of 3 saved of what would have been made that *Tear*.

The *Planters Houses* are built all along the *Sides* of the *Rivers* for the *Convenience* of shipping; they *Build* after the *English* manner, *Whiting* the inside of their *Houses* with *Mortar*, made of burnt *Oyster Shells* instead of *Lime*.

They have pure and wholesome *Water*, which they fetch wholly from *Springs*, whereof the *Country* is so full, that there is not a *House* but hath one nigh the *Door*.

XIX. The *Vessel*, in which we set *Sail* for *Virginia*, being about 200 or 250 *Tuns*, sprung a considerable *Leak*. The *Captain* had try'd all *Methods* that *Seamen* use upon such occasions to find the *Leak*; particularly they apply'd *Cans* to their ears to hear with; but all in vain: The working of the *Ship*, the *Tackle* and the *Sea* made such a noise, that they could discover nothing thereby. I then happily bethought my self of a *Speaking Trumpet* I had contrived for some other *Conveniencies*, of a differing *Shape* from the common *Sorts*: I bid him take it, and apply the broad end to the side of the *Ship*, the narrow end to his *Ear*, and it would encrease his hearing as much as it augmented the *Voice* the other way, and would ward the ear too from the *Confusion* of *Foreign Noise*. Upon the first *Application*, accordingly they heard it, tho' it happen'd to be at a considerable distance, and when they remov'd the *Trumpet* nigher, they heard it as if it had been the current of a mighty *River*. So that cutting there the *Cieling* of the *Ship*, they immediately stop'd the *Leak*.

In the *Sea* I saw many little things which the *Seamen* call *Carvells*; they are like a *Jelly* or *Starb* that is made with a cast of *Blue* in it; they swim like a small *Sheep's bladder* above the *Water*, downwards there are long *Fibrous strings*, some whereof I have found near half a *Yard* long. This

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I take to be a sort of *Sea Plant*, and the strings its *Roots* growing in the *Sea*, as *Duck-Weed* does in *Ponds*. It may be reckon'd amongst the *Potential Cauterics*: for when we were one Day becalm'd, the sportful People rubb'd it on one anothers Hands and Faces, and where it touch'd it would make it look very *Red*, and make it smart worse than a *Nettle*. In my return for *England* we struck a *Hawksbill-Turtle*, in whose Guts I found many of these *Carvels*: So that 'tis manifest they feed thereon.

The Air.

The Cape call'd *Cape Henry*, lies in 36½ of the *North Latitude*. The *Air* and *Temperature* of the *Seasons* is much govern'd by *Winds* in *Virginia* both as to *Heat* and *Cold*, *Dryness* and *Moisture*, whose *Variations* are very *Notable*, there being often great and sudden *Changes*; The *North* and *North-West* are very *Nitrous* and piercing, cold and clear, or else *Stormy*: The *South-East* and *South*, hazy and sultry hot. Their *Winter* is a fine clear *Air*, and dry, which renders it very pleasant; Their *Frosts* are short, but sometimes so very sharp, that it will freeze the *Rivers* over 3 *Miles* Broad; nay, the *Secretary of State* assur'd me, that it had frozen clever over *Potomack River*, over against his *House*, where 'tis near 9 *Miles* broad. I have observ'd it freezes there the hardest, when from a moist *South-East*, on a sudden the *Wind* passing by the *North*, a *nitrous* sharp *North-west Wind* blows; not with high *Gusts*, but with a cutting brisk *Air*; and those vales that seem then to be shelter'd from the *Wind*, and lie Warm, where the *Air* is most stagnant and moist, are frozen the hardest, and seiz'd the soonest, and there the *Fruits* are more subject to *blast* than where the *Air* has a free *Motion*. *Snow* falls sometimes in pretty *Quantity*, but rarely continues there above a *Day* or two. Their *Spring* is about a *Month* earlier than in *England*. In *April* they have frequent *Rains*, sometimes several short and sudden *Gusts*. *May* and *June* the *Heat* increases, and it is much like our *Summer*, being mitigated with gentle *Breezes*, that rise about 9 of the *Clock*, and decrease and incline as the *Sun* rises and falls. *July* and *August* those *Breezes* cease, and the *Air* becomes stagnant: so that the *Heat* is violent and troublesome. In *September* the *Weather* usually breaks suddenly, and there fall generally very *Considerable Rains*. When the *Weather* breaks many fall *Sick*; this being the time of an *Epidemical Sicknes*, for *Seasonings*, *Cachexies*, *Fluxes*, *Scorbutical Dropsies*, *Gripes*, or the like: which I have attributed to this Reason, That by the extraordinary *Heat* the *Ferment* of the *Blood* being raised too high, and the *Tone* of the *Stomach* relax'd, when the *Weather* breaks, the *Blood* palls, and like over-fermented *Liquors* is depauperated, or turns eager and sharp, and there's a *Crude Digestion*, whence the nam'd *Distempers* may be suppos'd to ensue. And for Confirmation I have observ'd the *Carminative Seeds*, such as *warm*, and whose *Oyl* sheaths the *Acid humours* that ever result from *Crude Digestions*; but *Decoctions* that retain the *Tone* of the *Stomach*, as I suppose, by making the little *Glands* in the *Tunics* of the *Stomach*, squeeze out their *Juice*, (for what is *Bitter* may be as well *Offensive* to the *Stomach*, as to the *Palate*) and then *Chalybiats* that raise the decay'd *Ferment*, are no bad *Practice*; after which, I conceive, *Ar-*
moniac

moniack Spirit might be very Beneficial. 'Tis wonderful to consider what Influence the *Air* has over Mens Bodies, whereof I had my self sad Affurances; for tho' I was in a very close warm Room, where was a Fire constantly kept, yet there was not the least Alteration or Change, whereof I was not sensible when I was sick of the *Gripes*. When a very Ingenious Gentlewoman was visited with the same Distemper, I had the opportunity of making very considerable Observations. I stood at the Window and could view the Clouds arise; for there small black fleeting Clouds would arise; and be swiftly carry'd cross the whole Element; and as these Clouds arose, and came nigher, her Torments were encreas'd, which were Grievous as a *Labouring Woman's*; there was not the least Cloud but lamentably affected her, and that at a considerable distance; but by her Shrieks it seem'd more or less, according to the bigness and nearness of the Clouds. The *Thunder* there is attended often with fatal Circumstances: I was with my Lord *Howard of Effingham* the Governour, when they brought word that one Dr. *A.* was kill'd therewith after this manner: He was *Smoaking a Pipe of Tobacco*, and looking out at his Window when he was struck *Dead*, and immediately became so *Stiff*, that he did not fall, but stood leaning in the *Window*, with the *Pipe* in his *Mouth* in the same *Posture* he was in when Struck: But this I only deliver as a Report, tho' I heard the same Account from several, without any Contradicting it. These things are remarkable, that it generally breaks in at the *Gable end* of the Houses, and often kills Persons in, or near the *Chimney's Range*, darting most fiercely down the *Funnel* of the *Chimney*, more especially if there be a *Fire*; I speak here confused of *Thunder* and *Lightning*, for when they do any Mischief, the *Crash* and *Lightning* are at the same Instant, which must be from the nearness of the Cloud. One time when the *Thunder* split the Mast of a Boat at *James-Town*, I saw it break from the Cloud, which it divided into two, and seem'd as if it had shot them immediately a *Mile* asunder, to the Eye. It is dangerous, when it *Thunders*, standing in a narrow Passage, where there's a thorough Passage, or in a Room betwixt two Windows; tho' several have been kill'd in the open Fields. 'Tis incredible to tell how'twill strike large *Oaks*, shatter and shiver them sometimes twisting round a Tree, sometimes as if it struck the Tree backwards and forwards. I had noted a fine spreading *Oak* in *James Town* Island, in the Morning I saw it fair and flourishing, in the Evening I observ'd all the *Bark* of the Body of the Tree, as if it had been artificially peel'd off, was orderly spread round the Tree in a Ring, whose Semi-diameter was 4 *Yards*, the Tree in the Center; all the Body of the Tree was shaken and split, but its boughs had all their *Bark* on; few Leaves were fallen, and those on the boughs as fresh as in the Morning, but gradually afterwards wither'd, as on a Tree that is fallen. I have seen several vast *Oaks* and other *Timber-Trees*, Twisted as if it had been a small *Willow* that a Man had twisted with his Hand, which I could suppose had been done by nothing but the *Thunder*. I have been told by very serious *Planters*, that 30 or 40 *Years* since, when the Country was not so open, the *Thunder* was

more fierce, and that sometimes, after violent *Thunder* and *Rain*, the *Roads* would seem to have a perfect Cast of *Brimstone*; and 'tis frequent after much *Thunder* and *Lightning*, for the *Air* to have a perfect *Sulphureous Smell*. Durst I offer my weak Reasons, I might here consider the Nature of *Thunder*, and compare it with some *Sulphureous Spirits* which I have drawn from *Coals* that I could no way condense, yet were inflammable; nay, would *Burn* after they pass through the *Water*, and that seemingly fiercer if they were not overpower'd therewith. I have kept of this *Spirit* a considerable time in *Bladders*; and tho' it appear'd as if they were only blown with *Air*, yet, if I let it forth, and fired it with a *Match* or *Candle*, it would continue burning till all were spent. An Observance of the *Meteors* there might perhaps not be Impertinent, as both what are more rare, and what are more frequent, as of *Gosmore* in great Abundance, and of those small *Cobwebs* in a Morning, which some have suppos'd to be *Meteors*. *Ignes fatui*, tho' there be many boggy *Swamps* and *Marshes*, are seldom, if any are, seen there.

There be frequent little sorts of *Whirl-winds*, whose Diameter may be sometimes not past 2 or 3 *Tards*, sometimes 40, which whisking round in a Circle, pass along the *Earth*, according to the Motion of the Cloud, from whence they issue; and as they pass along, with their Gyrons or Circular Motion they carry aloft the dry *Leaves* into the *Air*, which fall again often in places far remote. I have seen them descend in a calm Sun-shine Day, as if they had come from the *Heavens* in great *Showers* thereof, so that all the Elements seem'd fill'd therewith: and I could perceive them to descend from on high as far as I could possibly discern a *Leaf*.

I thought this made it manifest, whence many Preternatural Showers have happen'd. I remember at Sir Richard Atherton's in *Lancashire*, some few *Tears* ago, there fell a great Number of the Seed of *Ivy-berries*; at first we admir'd what they were, for they were covered with a thin Skin that was red, and resembled the Figure of a small *Wheat-Corn*; but afterwards they fully manifested what they were; for many sprouted and took Root: I suppose they were carried aloft by some such *Whirl-wind*, and let fall there. I have purposely gone into the Place where I perceived this *Gust*, which is Notorious enough by the Noise it makes, with Rattling the *Leaves* as it carries them aloft, and have found a fine sharp *Breeze* of *Wind*.

The Waters

Between the two *Capes*, the Southern, call'd the *Cape Henry*, and the more Northerly call'd *Cape Charles*, there runs up a great *Bay*, call'd the *Bay of Cheespeak*; 9 *Leagues* over in some Places, in most 7, Dividing *Virginia* into two Unequal Parts. On the *East* side of this *Bay* there lies a narrow Neck of Land which makes the Counties of *Northampton* and *Accomack*: On the *West* side of the *Bay* there branches forth 4 great *Rivers*, *James-River*, *Tork-River*, *Rapahanack*, and *Potomack*.

The Mouth of *James-River*, which is the most Southerly of them, to the Mouth of *Potomack*, which is the most Northerly, may be 100 *Miles* Distance: But as I have been credibly inform'd, the *Falls* of *James River* are not past 30 *Miles* from *Potomack*, which is

is a vast large River 9 Miles over in many places. I have been told it was Navigable nigh 200 Miles, much higher than any of the other Rivers: Whence I conclude in future Times, it will be the most considerable for Trade, when the Country comes to be Inhabited further up in the Main Land. The other Rivers are much about 3 Miles over a piece: And James-River is Navigable at the least 80 Miles. Within 4 or 5 Miles of James-Town, James-River and York-River are not past 4 or 5 Miles asunder. Yea, Sloops of considerable Carriage may Sail up the Branches of the two Rivers, till they come within a Mile the one of the other.

York-River is distant from Rapahanack in some places not past 10 or 12 Miles, and Rapahanack from Potomack not past 7 Miles in one place, tho' it may be 60 in others. The Heads of the Branches of the Rivers interfere and lock within one another: Which I think is best expressed after the manner that an Indian explained himself once to me, when I enquired how nigh the Rivers of Carolina, Virginia and Maryland arose out of the Mountains; from those that ran *Westerly* on the other side of the Mountains, he claspt the Fingers of one Hand 'twixt those of the other, crying, *They meet thus*; the Branches of different Rivers rising not past 100 Paces one from the other; so that no Country in the World can be more curiously Watered. But this Conveniency at present I look on as the greatest Impediment to the Advance of the Country, and the greatest Obstacle to Trade and Commerce: For the great Number of Rivers and the Thinness of the Inhabitants distract and disperse a Trade. So that all Ships in general gather each their Loading up and down an Hundred Miles distant, and the best of Trade that can be driven, is only a sort of Scotch Peddling: For they must carry all sorts of Truck that trade thither, having one Commodity to pass off another. This (*i.e.*) the Number of Rivers, is one of the chief Reasons why they have no Towns: For every one being more Solicitous for a Private Interest and Conveniency, than for a Publick, they will either be for making 40 Towns at once, that is 2 in every County, or none at all, which is the Country's Ruin.

The Tides in these Rivers regularly ebb and flow about 2 Foot perpendicular at James-Town; there is there as they call it, a Tide and half Tide, that is, it flows near 2 Hours along by the Shoar, after that it is Ebb in the Channel, and again it ebbs near two Hours by the Shore, after that it is Flood in the Channel.

I suppose this is caused by many Creeks and Branches of the Rivers which being considerably many, tho' only 3 or 4 Miles long, yet as broad as the Thames at London; others 10 Miles long, some above 20, that have little Fresh Water which they carry of their own, but their Current primarily depending upon the Flux and Reflux of the Sea. So that after the Tide is made in the Channel, it flows by the Shoar a Considerable time, being that these Creeks, are still to fill, and therefore as it were draws a Source upwards by the Shoar; and likewise when the Tide returns into the Channel, the Creeks that could not so readily disburse their Water, being still to empty themselves, they make an Ebbing by the Shoar a considerable time after that it is

Flood, as I say, in the *Channel*. So far as the *Salt-Waters* reach, the Country is deem'd less *Healthly*. In the *Freshes* they more rarely are troubled with the *Seasonings*, and those *Endemical* Distempers about *September* and *October*. This being very Remarkable, it might perhaps be worthy the Disquisition of the most Learned to give an Account of the various Alterations and fatal Effects that the *Air* has on Humane Bodies, especially when impregnated with a *Marine Salt*; more peculiarly when such an *Air* becomes stagnant.

There is one thing more Remarkable in *Virginia*; generally twice in the *Year*, *Spring* and *Fall*. At certain *Spring-Tides*, the most of the Cattle will set on *Gadding*, and run, tho' it be 20 or 30 *Miles*, to the *River* to drink the *Salt-Water*, at which time there's scarce any Stopping of them.

As for the *Waters* in the *Springs* in general, they are, I think somewhat more eager than those in *England*; in that I have observed, they require some quantity more of *Malt* to make *Strong Beer* than our *English Waters*, and will not bear *Soap*. I have try'd several by *Infusing* of *Galls*, and found little difference in the *Colours*, turning much what the *Colour* of common *Sacks* in *Taverns*.

There's a *Spring* in the *Isle of Wight* or *Nazamond County* vents the greatest *Source* of *Water* I ever saw, excepting *Holy Well* in *Wales*.

I could not try any thing as to their *Specifick Gravity*, having neither *Aquapoise*, nor those other *Glasses* I had contrived peculiarly for making such Experiments, they being all lost with my other things. I had *Glasses* blown would hold about 5 *Ounces*, other about 10 *Ounces*, with *Necks* so small, that a drop would make a considerable Variation; with these I could make more critical and satisfactory Observations as to the *Specifick Gravity* of *Liquors*, having *Critical Scales*, than by any other way yet by me tried. I used this Method to weigh *Urines*, which Practice I would recommend to the inquisitive and critical Physicians: For there are more signal Variations in the *Weights* of *Urines* than one would at first Imagine; and when the Eye can discover little, but judge two *Urines* to be alike they may be found to differ very much as to *Weight*. By *Weight* I find Observations may be made of *Affections* in the *Head*, which rarely make any Visible Alterations in the *Urine*. I have found 2 *Urines* not much unlike, differ 22 *Grains* in the Quantity of about 4 or 5 *Ounces*. But let them that make those Essays weigh all their *Urines* when cold, lest they be thereby deceived. But to return to the *Spring Waters* in *Virginia*. There's a *Spring* at my *Lady Berkley's*, call'd *Green Spring* (whereof I have been often told,) so very cold, that 'tis dangerous Drinking thereof in *Summer-Time*, it having proved of fatal Consequence to several.

There be many *Petrifying Waters*; and indeed I believe few of the *Waters* but participate of the *Petrifying Quality*, tho' there be few *Pebbles* or *Paving-stones* to be found in all the Country. But I have found many *Sticks* with *Crusty Congelations* round them in the *Runs of Springs*; and *Stones* figured like *Honey Combs*, with many little *Stars* as it were, shot in the *Holes*.

Mr. Secretary Spencer has told me of some Waters participating much of *Alome* or *Vitriol* towards *Potomack*: Up beyond the *Falls* of *Rapahannock* I have heard of *Poysonous-Waters*.

When you make the *Capes* of *Virginia*, you may observe it *low Land*, so that at some Distance the *Trees* appear as if they grew in the *Water*; and as you approach nigher, to emerge thence. For 100 *Miles* up into the Country, there are few *Stones* to be found, only in some Places *Rocks* of *Iron-Oar* appear.

In some Places for several *Miles* together, the *Earth* is so intermix'd with *Oyster-shells*, that there may seem as many *Shells* as *Earth*; and how deep they lie thus intermingled, I think, is not yet known; for at broken Banks they discover themselves to be continu'd many Yards perpendicular. In several Places these *Shells* are much closer, and being petrified, seem to make a *Vein* of *Rock*. I have seen in several Places, *Veins* of these rocky *Shells*, three or four *Tards* thick, at the Foot of a Hill, whose Precipice might be 20 *Tards* perpendicular, whose *Delf*, I suppose, shot under the Hill. Pieces of these *Rocks* broken off, lie there, which, I suppose, may weigh 20 or 30 *Tuns* a-piece, and are as difficult to be broken as our *Free-stone*. Of these *Rocks* of *Oyster-shells* that are not so much petrify'd, they burn and make all their *Lime*; whereof they have that Store, that no Generation will consume.

Often in the looser Banks of *Shells* and *Earth*, are found perfect *Teeth* petrify'd, some whereof I have seen, could not be less than 2 or 3 *Inches* long, and above an *Inch* broad, tho' they were not *maxillary Teeth*; the Part that one might suppose grew out of the *Jaw*, was *Polish'd*, and *Black*, almost as *Jett*; the Part which had been fasten'd in the *Jaw* and *Gums*, was *Brown*, and not so shiningly *polish'd*, or *Smooth*. If they were, as they seem'd to be, really *Teeth*, I suppose, they might have been of *Fishes*. The *Back-bone* of a *Whale*, and as I remember, they told me of some of the *Ribs*, were digg'd out of the side of a Hill, several *Tards* deep in the Ground, about 4 *Miles* distant from *James-Town* and the *River*. Mr. *Banister* a Gentleman pretty curious in those Things, shew'd me likewise the Joint of a *Whale's Back bone*, and several *Teeth*, some whereof, he said, were found in Hills beyond the *Falls* of *James-River*, at least, 150 *Miles* up in the Country.

The Soil in general is sandy. I had design'd, and I think it might be worth a critical Remark, to observe the Difference of *Soils* seem appropriated to the several Sorts of *Tobacco*: for there is not only the two distinct Sorts of *Sweet-scented*, and *Aranoko-Tobacco*, but of each of these be several Sorts much different, the *Seeds* whereof are known by distinct Names, they having given them the Names of those Gentlemen most fam'd for such Sort of *Tobacco*, as of *Prior-Seed*, &c. Nay, the same Sort of *Seed* in different *Earths*, will produce *Tobacco* much different, as to Goodness. The richer the Ground, the better it is for *Aronoko-Tobacco*, whose *Scent* is not much minded, their only Aim being to have it specious, large, and to procure it a bright *Kite Foot's Colour*.

I conceive *Tobacco* to be a Plant abounding with *Nitro-Sulphureous* Particles, for the *Planters* try the Goodness of their *Seed*, by casting a little thereof into the *Fire*; if it be good it will *Sparkle* after the manner of *Gun-powder*: so will the *Stalks* of *Tobacco Leaves*, and perhaps has something Analogous to the *Narcotick Sulphur* of *Venus*, which the *Chymists* so industriously labour after. The World knows little of the Efficacy of its *Oyl*, which has wonderful Effects in the *Curing* of *Old Inveterate Sores*, and *Scrophulous Swellings*, and some, otherwise apply'd and qualify'd. The Goodness of *Tobacco* I look on primarily consists in the *Volatility* of its *Nitre*; and hence the *Sandy Grounds* that are most impregnated therewith, and whose *Nitrous Salt* is most *Volatile*, (for such grounds are quickliest spent) yields *Tobacco* that has the richest *Scent*, and that shortly becomes a *Pleasant Smoak*; whereas, in *Tobacco* that grows on *Stiff-Ground*, the *Salt* seem more *Fix'd*, and lock'd up in the *Oyl*, so that whilst *New*, 'tis very *Heady*, and strong, and requires some time for its *Salts* to free themselves and become *Volatile*; which it manifests by its having an *Urinous Smell*. The same Reason satisfies, why *Tobacco* that grows on *Low-Lands*, as far as the *Salts*, tho' the Plant be never over-flow'd with *Salt-water*, yet the Ground that feeds the Plant being impregnated with *Salt-water*, that *Tobacco smoaks* not pleasantly, and will scarcely keep *Fire*, but do all that a Man can, will oft go out, 'till after it has been kept some considerable time; which may be assign'd to the more *Fixed Saline* Particles of the *Marine Salt* in these Plants, which require more time 'ere they be rendered *Volatile*. I have observ'd, that this which is call'd *Pine-Wood-Land*, tho' it be a *Sandy-Soil*, even the *Sweet-scented Tobacco* that grows thereon, being large and porous, agreeable to *Aranoko Tobacco*, *smoaks* as coarsly as *Aranoko*: wherefore 'tis, that I believe the *Microscope* might make notable Discoveries towards the Knowledge of good *Tobacco*: for the closer the Composition of the *Leaf*, the *Better* the *Tobacco*; and therefore the *Planters* and *Merchants* brag of the Substance of their *Tobacco*, which word, did they always take it in a true Sense, for the *Solidness*, and not mistake it for the *Thickness*, it would be more consonant to a true Observation; for as I said of the *Pine-Wood Tobacco*, some of it is *thick* and not *solid*, and differs from the best *Tobacco*, as *Buff* does from *tann'd Leather*; so that if the *Tobacco* be found and not rotten, you may give a great Guess at the Goodness of *Tobacco*, when you weigh the *Hogsheads*, before you see them: for if an equal Care be taken in the packing of them, the best *Tobacco* will weigh the Heaviest, and pack the Closest. Now I said, that the *Sweet-scented Tobacco* most in Vogue, which was most fam'd for its *Scent*, was that that grew on *Sandy-Land*; which is true, if you would *smoak* it whilst *New*, or whilst only 2 or 3 *Years* old; but if you keep the *Stiff-Land Tobacco*, which is generally a *Tobacco* of great Substance 5 or 6 *Years* it will much excell; for tho' the *Sandy-Land Tobacco* abound with a *Volatile Nitre* at first, yet the *Stiff-Land Tobacco* abounds with a greater Quantity of *Nitre*; only that it is lock'd up in its *Oyl* at first, and requires more Time to extricate it self, and become *Volatile*; but the *Pine-Wood-Land* having little of the *Nitro-Sulphureous*

tro-Sulphureous Particles, neither is, nor never will make any thing of a rich *Smock*. Discourſing hereof ſome Days ſince, to a Gentleman of good Obſervation, that has been verſ'd with *Mauling*, he aſſur'd me to back this my Suppoſition, or *Hypotheſis*, he had obſerv'd, that *Barly* that grew on *Stiff Ground*, requir'd more time conſiderably to mellow and come to Perfection, than that that grew on *Light Land*. Having proceeded thus far to ſpeak of *Tobacco*, I ſhall add one or two things more. The Planters differ in their Judgments, about the time of *Planting*, or *Pitching* their *Crops*: ſome are for *Pitching* their *Crops* very early, others late, without any Diſtinction of the Nature of the *Soils*; and 'tis from the different Effects that they find in that, that ſometimes the early, ſometimes the late *Planting* ſucceeds; but they have not the Reason to judge of the Cauſe, to conſider the Accidents of the Year, and the Difference of the *Soils*. In *Sandy Grounds* they need not ſtrive ſo much for early *Planting*, the Loofeneſs of the Earth, and the kind natur'd Soil, yielding all that it can, eaſily and ſpeedily, and *Sand* retaining the *Heat*, makes the *Plants* grow faſter. But in *Stiff-Soils*, if the *Crops* be not early *Pitch'd*, ſo that during the Seaſon of *Rains* it have got conſiderable Roots, and ſhot them ſome Depth, if early *Droughts* come, it ſo binds the Lands, that the Roots never ſpread nor ſhoot deeper or further than the *Hills* that they are *Planted* in. Obſerving this on the *Plantation* where I liv'd that it was *Stiff Ground*, I advis'd them to *Plant* their *Crops* as early as poſſible: and in order thereunto, I try'd ſeveral ways to further the *Plants*; and what I found moſt advantageous, was, by taking an *Infuſion* of *Horſe-Dung*, and putting thereon *Soot*, and then my *Seeds*; this I kept 48 *Hours* in an ordinary *Digeſſive Heat*. When I Sow'd, I mix'd *Aſhes* with the *Seed* (having decanted the *Liquor*.) that the *Seed* might Sow the *Eveneſt*: The effect was, that my *Plants* come up ſooner, grew Swifter, and I had five *Plants* for one, more than any of the other *Beds* round about mine.

There be various *Accidents* and *Diſtempers*, whereunto *Tobacco* is liable: as the *Worm*, the *Fly*, *Firing to Turn*, as they call them, *French-men*, and the like. I propos'd ſeveral ways to kill the *Worm* and *Fly*, as by *Sulphur*, and the like; but had no Opportunity to experiment it: I ſhall ſet down that I had moſt hopes of, which perhaps may give a hint to others to try or improve. *Tobacco Seed* is very ſmall, and by conſequence ſo is the *Young Plant* at firſt, and if gleamy Weather happen at that time, it breeds a ſmall *Fly*, which conſumes the *Plume* of the *Plant*; now it being early in the Year when they Sow the *Seed*, viz. about the 14th of *January*; they cover the Ground to ſecure, as well as they can, their tender *Plants* from the nipping *Froſts*, that may happen in the Nights; they cover them only with a few *Oak-Leaves* or the like; for *Straw* they find apt to Harbour or Breed this *Fly*. I therefore would adviſe them to *Smock Straw* with *Eriſtone*, once in 2 or 3 Nights, and ſo they might cover them ſecurely, with that which would preſerve them infinitely beyond the covering with *Oak Boughs*; indeed, I would adviſe them to keep peculiarly ſo much of their *Indian-Corn-Blades*, which they gather for their
Fodder,

Fodder, for this very purpose, being as I conceive much the best, there being no Chaff to foul their Beds, and prejudice them when they should *Weed* them.

What they call *Firing* is this : When *Plants* are of small Substance, as when there has been a wet and very cold Seasons and very hot Weather suddenly ensues, the *Leaves* turn *Brown*, and dry to dust ; the Cause I conceive to be hence : The *Plant* being feeble, and having a small Quantity of *Oil*, which makes the more *Solid* part of the *Plant*, the *Earth* being suddenly heated by the Sun's fiercer Beams, the *Roots* are rather scorched and dried up in the *Earth*, than nourished ; so that the *Plant* consisting only of *Watry* parts, is consumed, as it were, by *Fire* : sometimes hopeful *Plants*, when by a sudden Gust some *Master Veins* are Broken, if sudden Heat ensues they likewise *Fire* : For being not come to Maturity, and being deprived of the Supports of *Life* and *Vegetation*, they likewise perish, are dried up and fall to Dust.

French-men they call those *Plants* whose *Leaves* do not spread and grow large, but rather spire upwards, and grow Tall ; these *Plants* they do not Tend, being not worthy their Labour. Were they so Critical, I believe they might have great guess what *Plants* were most likely to turn *French-men*, by observing whether the *Roots* of the *Plants* run downwards, as those whose Branches are aptest to spire Upwards : For tho' I have not made positive Proof thereof. I have something more than bare Fancy for my Conjecture ; I have pull'd up some of these *French-men*, and compared them with the *Roots* of some other *Plants*, and found them much longer than others ; and 'tis Observable, loose Soils and Sandy Ground, are more subject thereto than the Stiff Land.

The Country of it self is one entire *Wood* consisting of large *Timber Trees* of several sorts, free from *Thickets* or *Under-Wood* ; the small *Shrubs* growing only on Lands that have been Clear'd, or in *Swamps* ; and thus it is for several *Hundreds* of *Miles*, even as far as has yet been Discover'd.

As to the River on the other side the Mountains, said to ebb and flow, I have been assur'd by Col. Bird, who is one of the Intelligentest Gentlemen in all *Virginia*, and knows more of *Indian* affairs than any Man in the Country, that it was a Mistake ; for that it must run into a *Lake* of fresh Water to which the *French* have given the Name of *Lake Petite*, there being several larger *Lakes*, 'twixt that and *Canada*. The *French* possessing themselves of these *Lakes*, no doubt will in short time be absolute Masters of the *Beaver Trade* ; the greatest Numbers of *Beavers* being caught there.

But to return to the Parts of *Virginia* inhabited by the *English*, which in general is a very Fertile Soil, far surpassing *England*, for their *English Wheat* (as they call it, to distinguish it from *Maze*, commonly call'd *Virginia Wheat*) yields generally 'twixt 15 and 30 Fold, the Ground only once Plowed ; whereas 'tis a good Crop in *England* that yields above 8 Fold, after all their Toil and Labour. And yet in truth it is only the barrenest Parts that they have Cultivated, Tilling and Planting only the High-Lands leaving the richer *Vales* unstirr'd, because they understand not any thing

of *Draining*. So that the richest *Meadow Lands*, which is one third of the Country, is *Boggy, Marsh, and Swamp*, whereof they make little Advantage, but lose in them abundance of their Cattle, especially at the first of the *Spring*, when the Cattle are Weak, and venture too far after young Grass. Whereas vast Improvements might be made thereof; for the generality of *Virginia* is a *Sandy Land* with a *shallow Soil*. So that after they have cleared a fresh piece of Ground out of the *Woods* it will not bear *Tobacco* past 2 or 3 *Years*, unless *Cow-pen'd*; for they *Manure* their Ground by keeping their Cattle, as in the South you do your Sheep, every Night confining them within *Hurdles*, which they remove when they have sufficiently *Dung'd* one Spot of Ground. But alas! They cannot improve much thus: Besides it produces a strong sort of *Tobacco*, in which the *Smoakers* say they can plainly taste the Fulsomeness of the *Dung*. Therefore every 3 or 4 *Years* they must be for *Clearing* a new piece of Ground out of the *Woods*, which requires much Labour and Toil, it being so thick grown all over with massy Timber. Thus their *Plantations* run over vast Tracts of Ground each ambitioning to engross as much as they can, that they may be sure to have enough to *Plant*, and for their Flocks and Herds of Cattle to range and feed in: So that *Plantations* of 1000, 2000, or 3000 *Acres* are common; whereby the Country is thinly inhabited; their living Solitary and Unsociable; Trading confused and dispersed; besides other Inconveniences. Whereas they might improve 200 or 300 *Acres* to more advantage, and would make the Country much more Healthy; for those that have 3000 *Acres* have scarce *Cleared* 600 *Acres* thereof, which is peculiarly termed the *Plantation*, being surrounded with the 2400 *Acres* of *Woods*, so that there can be no free or even Motion of the *Air*, but the *Air* is kept either *Stagant*, or the lofty *Sulphureous* Particles of the Air, that are higher than the tops of the Trees, which are above as high again as the generality of the *Woods* in *England*, Descending when they pass over the *Cleared* spots of Ground, must needs in the violent Heat of Summer, raise a preternatural Ferment, and produce bad Effects. Nor is it any advantage to their Stocks or Crops; for did they but *drain* their *Swamps* and *Low-Lands*, they have a very deep Soil, that would endure *Planting* 20 or 30 *Years*; and some would scarce ever be worn out, but be ever longer Better, for they might lay them all Winter, or when they pleased, in Water, and the Product of their Labour would be Double or Treble, whether *Corn* or *Tobacco*.

On the *Plantation* where I Lived, I drain'd a good large *Swamp*, which fully answered Expectation, for with 3 Men in 13 Days I *drained* the whole *Swamp*, and it being *Sandy Land*, soaks and drains admirably well, and what I little expected, I laid a *Well* dry at a considerable distance. The Gentlewoman, who was Owner of that *Plantation* was in *England* last Year, and I think Dr. *Moulin* was by when she asked me, Now to teach her how she might make her *Tobacco* that grew in that *Swamp* less, for it produced so very large, that it was suspected to be of the *Aranoko* kind: I

told her tho' the complaint was Rare, yet there was an excellent Remedy for that, in letting every *Plant* bear 8 or 9 *Leaves* instead of 4 or 5 and she would have more *Tobacco*, and less *Leaves*.

There are many other Places as easie to *Drain* as this, tho' of larger extent and richer *Soil*: Even in *James-Town Island*, which is much what of an *Oval Figure*, there's a *Swamp* runs *Diagonalwise* over the *Island*, whereby is lost at least 150 *Acres* of *Land*, which would be *Meadow*, and would turn to as good account as if it were in *England*: Besides it's the great *Annoyance* of the *Town*, and no doubt but it makes it much more *Unhealthy*. If therefore they but scour'd the *Channel*, and made a pretty ordinary *Trench* all along the middle of the *Swamp*, and placed a *Sluice* at the *Mouth* where it opens into the back *Creek*; for the *Mouth* of the *Channel* there is *Narrow*, has a good hard *Bottom*, and is not past 2 *Yards* *Deep* when the *Flood* is out; as if *Nature* had design'd it before hand: They might thus *Drain* all the *Swamp* absolutely dry, or lay it under *Water*, at their pleasure.

And now since we are speaking of *James-Town* give me leave to adjoyn some *Reflections* as to the *Situation* and *Fortifications* of the *Place*. *James-Town-Island* is rather a *Peninsula*, being joyned to the *Continent* by a small *Neck* of *Land*, not past 20 or 30 *Yards* over, and which at *Spring-Tides* is overflowed, and is then an absolute *Island*. Now they have built a silly sort of a *Fort*, that is, a *Brick-Wall* in the *Shape* of a *half Moon*, at the beginning of the *Swamp*, because the *Channel* of the *River* lies very nigh the *Shoar*: But it is the same as if a *Fort* were built at *Chelsey* to secure *London* from being taken by *Shipping*. Besides *Ships* passing up the *River* are secured from the *Guns* of the *Fort*, till they come directly over against the *Fort*, by reason the *Fort* stands in a *Vale*, and all the *Guns* directed down the *River* that should play on the *Ships*, as they are coming up the *River*, will lodge their shot within 10, 20, or 40 *Yards*, in a rising *Bank*, which is much above the *Level* of the *Fort*; so that if a *Ship* gave but a good broad *Side*, just when she comes to bear upon the *Fort*; she might put the *Fort* in that *Confusion*, as to have free *Passage* enough.

But if they would build a *Fort* for the *Security* of the *Town* and *Country*, I conceive it should be on *Archer's-Hope-Point*, for that would stop the *Ships* from passing up the *River*, before they come to the *Town*, and would secure the *Town*, from being block'd up by *Sea*. The *Channel* at *Archer's Hope Point* lies close by the *Shoar*, and make such an *Angle* there by reason of *Hog Island*, that going up or down the *River*, let the *Wind* be where it will, they must there bring the *Contrary Tack* on *Board*, and generally when they about the *Ship*, as they call it, they are so nigh the *Shoar*, that a *Man* may almost fling a *Finger stone* on *Board*. How much this hinders the *Motion* of a *Ship*, and what confusion it must be to them to bring a *contrary Tack* on *Board* whilst they have all the *Guns* of a *Fort* playing so nigh upon them, may readily be conceived. *Archer's Hope* is a *Neck* of *Land* that runs down 3 *Miles* long, not much past half a *Mile* *Broad*, betwixt the *Main River* and *Archer's-Hope-Creek*, which has large

Marshes

Marshes and Swamps; so that a *Citadel* built upon the *Point*, would almost be impregnable, being it could be attack'd no way but one, which is so narrow a slender Neck of Land, that it would be difficult to take it that way: And it would secure *James-Town* from being *blocked*, being it would not be past a *Mile* by Water, to the *Point of James-Town-Island*; and the *Island* is so surrounded with Water and *marshy* Land, that the Town could never be bomb'd by Land.

But now to return to the Reflections of *improving* and *manuring* of Land in *Virginia*; hitherto, as I have said, they have used none but that of *Cow-Penning*; yet I suppose they might find very good *Marle* in many Places: I have seen both the *Red* and *Blew-Marle* at some Breaks of Hills. This would be the properest *Manure* for their *Sandy Land*, if they spread it not too thick, theirs being, as I have said, a *shallow sandy Soil*; which was the Reason I never advis'd any to use *Lime*, tho' they have very good *Lime* of *Oyster-shells*; for that's the properest *Manure* for cold clay Land, and not for *sandy Soil*. But as most Lands have one *Swamp* or another bordering on them, they may certainly get admirable *Slitch*, wherewith to *manure* all their *Up-Lands*. But this, say they, will not *improve* Ground, but clods and grows hard. 'Tis true, it will do so for some Time, a *Year* or *two* at the first; but did they cast it in *Heaps*, and let it lie for 2 or 3 *Years*, after a *Frost* or *two* had seiz'd it, and it had been well pierc'd therewith, I doubt not it would turn to good Account. And for this, I have something more than bare Conjecture; for discoursing it once with a good notable *Planter*, we went to view a *Heap* thereof that casually he had cast up 'twixt 3 or 4 *Years* before, and we found it not very binding, but rather a fine natural *Mould*; whereupon he did confess, he then remember'd that out of a Ridge of the like *Mould*, he had had very large *Plants*, which must have been of the like *Slime* or *Slitch* cast up before. But he said, that himself and others despair'd of this *Manure*, because they had taken of this *Slitch* fresh and moist out of the *Swamp*, and fill'd *Tobacco-Hills* with it, and in the midst of it *planted* their *Plants*; which so bound the *Roots* of their *Plants*, that they never came to any thing.

They neither *house* nor *milk* any of their *Cows* in *Winter*, having a Notion that it would kill them; yet I perswaded the Lady where I liv'd, to *milk* 4 *Cows* the last *Winter* that I stay'd in the Country, whereof she found so good Effect, that she assur'd me she would keep to my Advice for the Future; and also, as I had further urg'd, *house* them too, for which they have mighty Conveniencies, their *Tobacco Houses* being empty ever at that time of the Year, and may easily be fitted in 2 or 3 Days time without any Prejudice, whereby their Cattle would be much shelter'd from those pinching sharp *Frosts* that some Nights on a sudden become very severe. I had another Project for the Preservation of their Cattle prov'd very successful; I urg'd the Lady to sow her *Wheat* as early as possibly she could, so that before *Winter* it might be well rooted, to be early and flourishing at the first of the *Spring*: So that she might turn thereon her weak Cattle, and such as should at any time be *swamp'd*, whereby they

might be recruited and sav'd, and it would do the *Wheat* good also. I advis'd her likewise to save and carefully gather the *Indian Corn* Tops and Blades, and all her Straw, and whatsoever could be made *Fodder*, for her Cattle; for they get no *Hay*, (tho' I was urging her to that too, and to sow *Saintfoin*; for being a *sandy Soil*, I am confident it would turn to a very good Account,) and little *Fodder*, but as they think *Corn* being more nourishing, feed them with their *Indian Corn*, which they give them Morning and Evening. Thus they spend great Quantity of *Corn*, and when all's done, what signifies 2 or 3 Heads of *Corn* to a Beast in a Morning? It only makes them linger about the Houses for more; and after such sweet Food they are not so apt to brouze on the Trees, and the coarse Grass which the Country affords; so that their *Guts* shrink up, and they become *Belly shot*, as they call it. I advis'd therefore never to give them any thing in a Morning, whereby as soon as they were set forth of the *Cow-pens*, they would fall a feeding, and tho' they fill'd their Bellies only with such coarse Stuff as had little Nourishment in it, yet it would keep out their Bellies, and they would have a better *Digestion*; and then when they were come home at Night, to fodder them, beginning with *Straw* and their coarsest *Fodder*, which they would learn to eat by Degrees, before they tasted that that was more delicate, and whilst their *Digestion* was strong, would yield them Nourishment to keep them still so; afterward, when the *Winter* pinch'd, their fine Fodder then would stand them in stead; and hereby they might preserve their weakest Cattle, by these Methods and help of the *Wheat-patch*. She, (the Gentlewoman where I liv'd,) sav'd all her Cattle, and lost not one in 2 *Winters* after, that I stay'd there; besides she sav'd above 20 Barrels of *Corn*, and a Barrel of *Corn*, is commonly worth 10 *Shillings*. Nay further, The last Spring she fed 2 Beasts, a Bullock and a Cow, fat upon her *Wheat*, with the Addition only of a little boild *Corn*, and yet the *Wheat* was scarce eat down enough.

But to return again to the Nature of the *Earth*. I have observ'd, that at 5 or 6 Yards deep, at the Breaks of some Banks, I have found *Veins* of Clay, admirable good to make *Pots*, *Pipes*, or the like; and whereof I suppose the *Indians* make their *Pipes*, and *Pots* to boil their Meat in, which they make very handsomely, and which will endure the *Fire* much better than most *Crucibles*. I took of this Clay, dry'd, powder'd, and sifted, powder'd and sifted *Potshards*, and *Glasses*; 3 parts, 2 parts, and one part, as I remember; and therewith made a large *Crucible*, which was the best I yet ever try'd in my Life: I took it once red-hot out of the *Fire*, and clapt it immediately into the Water, and it started not at all. The Country abounds mightily with *Iron-Ore*, that, as I have been assur'd by some upon Tryal, has been found very good. There are Rocks thereof appear at the Precipice of Hills, at the Foot whereof there runs a River fit for a Forge, and there's *Wood* enough to supply it with *Charcoal*. As I have heard, there were formerly some Persons undertook the Work, and when they had made but a small Quantity of *Iron*, which prov'd very good, the *Indian Massacre* happen'd, and they being higher seated than the then inhabited part.

part of the Country, were all cut off, and the *Works* demolished. Some *Indians* brought Col. Bird some *Black-Lead*, whereof he has told me there is great Store. There's very curious *Talk* towards the *Falls* of *Rapahanack River*, which they *burn*, and make a delicate *white Wash* of it. The Secretary of State, Col. *Spencer*, has assur'd me, there were *Vitriolick* or *Aluminous Earths* on the Banks of *Potomack*.

There are 3 Sorts of *Eagles*; the largest I take to be that they call the *Grey-Eagle*, being much of the Colour of our *Kite* or *Glead*. The second is the *Bald-Eagle*, for the Body and part of the Neck being of a dark *Brown*, the Upper part of the Neck and *Head* is cover'd with a *white* sort of *Down*, where it looks very *Bald*, whence it is so nam'd. The 3d sort is the *Black-Eagle*, resembling most the *English Eagle*; they build their Nests much after the Manner that Dr. *Willoughby* describes, and generally at the Top of some tall old Tree, naked of Boughs and nigh the River side, and the People fell the Tree generally when they take the Young. They are most frequently sitting on some tall Tree by the River side, whence they may have a Prospect up and down the River, as I suppose, to observe the *Fishing-Hawks*; for when they see the *Fishing-Hawk* has struck a *Fish*, immediately they take *Wing*, and 'tis sometimes very pleasant to behold the Fight, for when the *Fishing-Hawk* perceives her self pursued, she will scream and make a terrible Noise, till at length she let fall the *Fish* to make her own escape, which the *Eagle* frequently catches before it reach the Earth or Water. These *Eagles* kill young *Lambs*, *Pigs*, &c.

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The *Fishing-Hawk* is an absolute Species of *King's Fisher*, but full as large, or larger than our *Jay*; much of the Colour and Shape of a *King's Fisher*, tho' not altogether so curiously feather'd; it has a large Crop; as I remember, there is a little *King's Fisher* much the same, in every Respect with ours.

If I mistake not, I have seen both the *Goss-Hawk*, and *Falcon*; besides there are several Sorts of the lesser Kind of *Stannels*.

There is likewise the *Kite* and the *Ringtail*.

There's both a *brown Owl* and a *white Owl*, much what as large as a *Goose*, which often kills their *Hens* and *Poultry* in the Night. The *white Owl* is a very delicately feather'd Bird; all the Feathers upon her Breast and Back being *Snow white* and tipp'd with a Punctal of *Jet black*. Besides, there is a *Barn-Owl* much like ours; and a little Sort of *Scritch-Owl*.

There's both the *Raven* and the *Carrion-Crow*.

The *Night-Raven* which some call the *Virginian Batt*, is about the Bigness of a *Cuckow*, feather'd like them but very short, and short legg'd, not discernable when it flies; which is in the Evening, scudding like our *Night-Raven*.

There's a great Sort of *ravenous Bird* that feeds upon *Carrion*, as big very nigh as an *Eagle*, which they call a *Turkey-Bustard*, its Feathers are of a *dusky Black*, it has *red Gills*, resembling those of a *Turkey*, whence it has its Name; it is nothing of the same Sort of Bird with our *English Turkey-Bustard*,

Buflard, but it is rather a Species of the *Kites*, for it will hover on the Wing something like them, and is *Carnivorous*. The *Fat* thereof dissolved into an *Oil*, is recommended mightily against *Old Aches* and *Sciatica Pains*.

The *Pica Glandaria* or *Jay*, is much less than our *English Jay*, and of another Colour: For it is all *Blue* where ours is *Brown*; the Wings *marbled* as curiously as ours are; it hath both the same *Cry*, and sudden jetting Motion.

There are great Variety and Curiosity in the *Wood-peckers*; there's one as big as our *Magpy*, with *blackish brown* Feathers, and a large *scarlet Tuft* on the Top of the Head. There are 4 or 5 Sorts of *Wood-peckers* more, variegated with *green*, *yellow* and *red Heads*; others spotted *Black* and *White*, most lovely to behold: There's a Tradition amongst them, That the *Tongue* of one of these *Wood-peckers* dry'd will make the *Teeth* drop out if pick'd therewith, and cure the *Tooth ach*.

There be *wild Turkeys* extream large; they talk of *Turkeys* that have been kill'd, that have weigh'd betwixt 50 and 60 *Pound Weight*; the largest that ever I saw, weighed something better than 38 *Pounds*. They have very long *Legs*, and will run prodigiously fast: I remember not that I ever saw any of them on the *Wing*, except it were once. Their *Feathers* are of a *blackish shining* Colour, that in the *Sunshine* like a *Dove's Neck*, are very specious.

Hens and *Cocks* are for the most part without *Tails* and *Rumps*; and as some have assured me our *English Hens*, after some time being kept there, have their *Rumps* rot off; which I am the apter to believe, being all their *Hens* are certainly of *English Breed*. I'm sorry I made no *Anatomical Observations* thereof, and Remarks about the Use of the *Rumps* in *Birds*, which at present I take to be a Couple of *Glands*, containing a sort of Juice for the varnishing of the *Feathers*; having observed all *Birds* have much Recourse with their *Bills* to the *Rumps* when they dress their *Plumes*, whereby they scud through the *Air* more nimbly in their *Flight*.

Partridges there are much smaller than ours, and resort in *Covies* as ours do; their *Flesh* is very white, and much excels ours in my Mind: *Sed de Gustibus non est disputandum*.

Their *Turtle-Doves* are of a *dusky blew* Colour, much less than our common *Pigeons*, the whole *Train* is longer much than the *Tails* of our *Pigeons*, the *middle Feather* being the longest. There's a strange Story of a vast Number of these *Pigeons*, that came in a Flock a few *Years* before I came thither, they say, they came through *New-England*, *New-York* and *Virginia*, and were so prodigious in Number as to darken the *Sky* for several Hours in the Place over which they flew, and brake massie Boughs where they lighted, and many like Things which I have had asserted to me by many *Eye-Witnesses* of Credit, that to me it was without Doubt, the *Relators* being very sober Persons, and agreeing in the Story; nothing of the like ever happen'd since; nor did I ever see past 10 in a Flock together that I remember.

The *Thrush* and *Feldefare* are much like ours, and are only seen in *Winter* there, according as they are here.

Their *Mocking Bird* may be compared to our *Singing Thrushes*, being much of the same Bigness: There are 2 sorts, the *Grey* and the *Red*: the *Grey* has Feathers much of the Colour of our *Grey Plovers*, with white in the *Wings* like a *Magpye*; this has the much *Softer Note*, and will Imitate in its *Singing*, the *Notes* of all *Birds* that it hears, and is accounted much the finest *Singing Bird* in the *World*.

This *Mocking Bird* having its Name from *Mimicking* all other *Birds* in *Singing*, is a wonderful mettled Bird bold and brisk, and yet seems to be of a very tender Constitution, neither *Singing* in *Winter*, nor in the midst of *Summer*, and with much difficulty are any of them brought to live in *England*.

The *Red Mocking Bird* is of a *Dusky Red* or rather *Brown*: it *Sings* very well, but has not so *Soft* a *Note* as the *Grey Mocking Bird*.

Of the *Virginia-Nightingale*, or *Red-Bird*, there are 2 sorts; the *Cocks* of both sorts are of a pure *Scarlet*, the *Hens* of a *Dusky Red*. I distinguish them into 2 sorts; for the one has a *Tufted Cops* on the *Head*, the other is *Smooth-Feathered*. I never saw a *Tufted-Cock* with a *Smooth-Headed Hen*, or on the contrary; they generally *Resorting* a *Cock* and *Hen* together, and play in a *Thicket* of *Thorns* or *Briars* in the *Winter*, nigh to which the *Boys* set their traps, and so catch them and sell them to the *Merchants* for about 6 *Pence* a piece, by whom they are brought for *England*; they are something less than a *Thrush*.

There's a Bird very *Injurious* to *Corn*, they call a *Black Bird*; I look on it to be a sort of *Starling*, for they cry something like them, but do not *Sing*, much what of the same Bigness, have *Flesh Blackish* like theirs; they *Resort* in great *Flocks* together; they are as *Black* as a *Crow* all over, their *Bills* and all, only some of them have *Scarlet Feathers* in the *Pinions* of their *Wings*.

They have a *Lark* nothing differing from our common *Lark*; they have another Bird which they call a *Lark* that is much larger, as big as a *Starling*; it has a *Soft Note*, feeds on the *Ground*, and as I remember has the *Specific* Character of *Long Heel*, it is more enclined to *Yellow*, and has a large *half-Moon* on its *Breast* of *Yellow*.

They have a *Martin* very like, only larger than, Ours, that builds after the same manner. The *Honourable Col. Bacon* has remarked for several *Years*, that they constantly come thither upon the 10th of *March*, one or two of them appearing before, being seen *Hovering* in the *Air* for a *Day* or two, then go away, and as he supposed returned with the great *Flock*. The *Colonel* delighted much in this *Bird*, and made *Holes* like *Pigeon Holes* at the end of his *House* with *Boards* purposely for them.

Their *Swallow* differs but little from Ours.

They have a Bird they call a *Blew Bird* of a *Curious Azure* Colour about the Bigness of a *Chafinch*.

There be other sorts of *Goldfinches* variegated with *Red*, *Orange*, and *Yellow* Feathers, very *Specious* and *Beautiful*. Spar-

Sparrows not much different from the *English*, but they Build not in the *Eaves* of *Houses* that every I saw.

The *Snow Bird* which I take to be much the same with our *Hedge Sparrow*; this is so call'd because it seldom appears about *Houses*, but against *Snow* or very cold Weather.

The *Humming-Bird*, that feeds on the *Honey* of *Flower*. I have been told by some Persons, that they have kept of these *Humming Birds* alive, and Fed them with Water and Sugar; they are much the *Smallest* of all Birds, have long *Bills* and curious coloured Feathers; but differ much in Colour.

Herons 3 or 4 several sorts; one larger than the *English*, Feathered much like a *Spanish Goose*; Another sort that only comes in Summer, *Milk-White*, with *Red Legs*, very lovely to behold.

The *Bittern* is there less than in *England*, and does not make that *Sound-ing Noise*, that ever I heard.

Curlews something less than our *English*, tho' Bigger than a *Wim-brel*.

The *Sand Piper* much resembling the *English*.

The *Snipe*, two sorts, one resembling ours, the other much less.

The *Tewits* are smaller than the *English*, and have no long *Toppings*, but just like a young one that begins to Fly.

There are great Numbers of *Wild-Swans*.

Wild-Geese and *Brent-Geese* all Winter in mighty Flocks; *Wild-Ducks* innumerable; *Teal*, *Wigeon*, *Sheldrakes*, *Virginia-Didapers*, the *Black-Divers*, &c.

In my return home for *England*, May 1686, off of the *Banks* of *New-Found-Land*, when we were according to account, 100 *Leagues* from the Shore, we saw several prodigious floating Islands of the *Ice*, no less to our Wonder than Terror; for they were very dangerous. I got the Master to Sail one Day as nigh one of them as we securely durst, which we judg'd to be full a *League* in Length, and was higher above Water than the Top of our *Main-Mast*: the *Snow* drove to and fro upon it, as upon a large Plane. There was a great Flock of small *Black-divers*, that were not much bigger than a *Feldefare*, came to us a little before, but all of them then left us and betook themselves to this Island of *Ice*. We saw as I remember, nigh 30 of these Islands of *Ice*. Capt. *Rider*, being some few Days later in his Passage, and bearing more to the Nore, told me, he saw many more of those Islands of *Ice*, and some much larger.

There are in *Virginia* a great many *Cormorants*; several sorts of *Gulls*, and in and about the Bay many *Bannets*.

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There were neither *Horses*, *Bulls*, *Cows*, *Sheep*, or *Swine*, in all the Country, before the coming of the *English*, as I have heard, and have much reason to believe: But now amongst the *English* Inhabitants there are good store of *Horses*, though they be very negligent and careless about the Breed. It is true, there is a *Law*, that no *Horse* shall be kept Stoned under a certain Size: but it is not put in Execution. Such as they are, there are good Store, and as cheap or cheaper than in *England*, worth about 5 Pounds

5 Pounds a piece. They never *Shoe* them, nor *Stable* them in general: yet they ride pretty sharply; a *Planter's Pace* is a Proverb, which is a good sharp Hand-gallop. The *Indians* have not yet learn'd to *ride*, only the *King of Pomonkie* had got 3 or 4 *Horses* for his own Saddle and an attendant, which I think should in no wise be indulg'd, for I look on the allowing them *Horses* much more dangerous than even *Guns* and *Powder*.

Wild-Bulls and *Cows* there are now in the *Uninhabited Parts*, but such only as have been Bred from some that have stray'd, and become *Wild*, and have propagated their kind, and are Difficult to be shot, having a great Acuteness of Smelling. The common Rate of a *Cow* and a *Calf* is 50 s. be she big or little: They are never very Curious to examine that Point.

Their *Sheep* are of a middling Size, pretty fine fleeced in general, and most Persons of Estate begin to keep *Flocks*: which hitherto has not been much regarded, because of the *Wolves* that destroy them; so that a piece of *Mutton* is a finer Treat, than either *Venison*, *Wild-Goose*, *Duck*, *Widgeon*, or *Teal*.

Elkes I have heard of, and there are abundance of brave *Red Deer*, so that a good *Woodfman*, as they call him, will keep a House with *Venison*. The *Indians*, they say, make *Artificial* sorts of *Heads* of Boughs of Trees, which they consecrate to their *Gods*, and these they put on to deceive the *Deer* when they go a *Shooting* or *Hunting*, as they call it, and Mimicking the feeding of the *Deer*, they by degrees get within Shot.

Swine they have now in great abundance, *Shoats*, or *Porkrels* are their general Food; and I believe as good as any *Westphalia*, certainly far exceeding our *English*.

Rackoon; I take to be a Species of a *Monkey*, something less than a *Fox*, Gray-hair'd, its Feet formed like a Hand, and the *Facetoo* has likewise the resemblance of a *Monkey's*: Besides being kept tame, they are very *Apish*. They are very prejudicial to their *Poultry*, as I remember.

An *Opossum*, as big, and something shaped like our *Badgers*, but of a lighter *Dun Colour*, with a long Tail, something like a *Rat*, but as thick as a Man's Thumb. The *Skin* of its *Belly* is very large, and Folded, so as to meet like a *Purse*, wherein they secure their Young whilst little and tender, which will as Naturally run thither, as *Chickens* to a *Hen*: In these *False Bellies* they will carry their Young. They feed on, and devour *Corn*.

Hares; many will have them to be a *Hedge-Rabbit*, but I know not what they mean thereby. I take them to be a perfect Species of *Hares*, because I have seen *Leverets* there with the *white Spots* in the Head, which the old Ones have not, so is it in *England*; and the *Down* is perfectly of the Colour of our *Hares*; they sit as our *Hares* do, and make no *Holes* and *Burrows* in the Earth. True, they are but about the bigness of an *English Rabbit*, and run no faster: they generally take into some Hollow-Tree within a little space; which then the People catch by gathering the *Wither'd Leaves*, and setting them on Fire within the Hollow of the Tree,

and so Smeaking of them till they fall down. Sometimes they take long Bryers, and twist them in the Down and Skin, and so pull them forth.

Squirrels; there are 3 sorts. The *First* is the great *Fox-Squirrel*, much larger than the *English*, and *Grey*, almost as a common *Rabbit*. These are very common; I have eaten of them at the best Gentlemens Table, and they are as good as a *Rabbit*. The 2d is the *Flying-Squirrel*, of a lighter *Dun-Colour*, and much less than the *English Squirrel*; the *Skin*, on either side the *Belly* extended is very large betwixt the fore-Leg and hind-Leg, which helps them very much in their skipping from one Bough to another, that they will leap further than the *Fox-Squirrel*, though much less; yet this is still rather *Skipping* than *Flying*, though the Distinction be well enough. The 3d is the *Ground-Squirrel*; I never saw any of this sort, only I have been told of them, and have had them thus describ'd to me, to be little bigger than a *Mouse*, finely spotted like a young *Fawn*: By what I further apprehended, they are an absolute sort of *Dor-Mouse*, only different in Colour.

Musk Rats; in all things shap'd like our *Water-Rats*, only something larger; and is an absolute Species of *Water-Rats*, only having a curious *Musky-Scent*. I have kept one for a certain time in a Wooden Chest; two Days before it Dy'd it was extraordinary *Odoriferous*, and *Scented* the room very much, but the Day that it Dy'd and a Day after, the *Scent* was very small, yet afterwards the *Skin* was very *Fragrant*; the *Stones* also smelt very well. They build Houses as *Beavers* do, in the *Marshes* and *Swamps* by the *Water-sides*, with 2 or 3 ways into them, and they are finely daub'd within; I pull'd one in pieces purposely to see the Contrivance; there were 3 different Lodging Rooms, very neat, one higher than another as I conceive purposely made for retirement, when the *Water* rises higher than ordinary: They are considerably large, having much trash and lumber to make their Houses withal. I suppose they live mostly on *Fish*.

Bats, as I remember, at least two sorts; one a large sort with *Long Ears*, and particularly long straggling *Hairs*: the other much like the *English*, something larger, I think, very *Common*.

I never heard of any *Lions*; they told me of a Creature kill'd whilst I was there, in *Glocester County*, which I conceiv'd to be a sort of *Pard*, or *Tyger*.

Bears there are, and yet but few in the Inhabited parts of *Virginia*; towards *Carolina* there are many more. They are not very fierce, their *Flesh* is commended for a very rich sort of *Pork*: but the *Lying* side of the *Bear*, as I remember, is but half the Value of the other, weight for weight.

There are several sorts of *Wild-Cats*, and *Poll-Cats*.

Beavers build their Houses in like manner as the *Musk Rats* do, only much larger: and with pieces of *Timber* make *Dams* over *Rivers*; as I suppose either to preserve their *Furrs* dry in their Passage over the *Rivers*; or otherwise to catch *Fish* by standing to watch them thereon, and jumping upon them on a sudden. They are very subtle Creatures: And if half of the stories be true that I have been told, they have a very orderly Government amongst them; in their Works each knows their proper Work, and Station,

Station, and the Over-seers beat those young ones that loiter in their Business, and will make them cry, and work stoutly.

Wolves there are great store; you may hear a Company *Hunting* in an Evening, and yelping like a pack of *Beagles*; but they are very cowardly, and dare scarce venture on any thing that faces them, yet if Hungry will pull down a good large *Sheep* that flies from them.

Foxes; they are very much like *ours*; only their *Furr* is much more grizzled, or gray.

Every House keeps 3 or 4 *Mungrel Dogs* to destroy Vermine; such as *Wolves*, *Foxes*, *Raccoons*, *Opoffoms*, &c. but they never hunt with *Hounds*, I suppose because there are so many Branches of Rivers, that they cannot follow them. Neither do they keep *Grey-Hounds*, because they say, that they are subject to break their Necks by running against Trees; and any Cur will serve to run their *Hares* into a *Hollow-Tree*.

They have great store of *Land* and *Water-Tortoises*; but they are very small; I think, I never saw any in that Country to exceed a *Foot* in Length. There is also another sort of *Land-Tortoise*, different from the common Sort, with a higher ridg'd Back, and speckled with red Sort of Spots.

Frogs they have of several Sorts; one of a prodigious Largeness, 8 or 10 times as big as any in *England*, and it makes a strange Noise, something like the bellowing of a *Bull*, or betwixt that and the hollow sounding Noise that the *English Bittern* makes. Another very common Sort, which they call *Toads*, because *Black*, but I think differs nothing from our *black Frog*. They have *Toads* also like ours in *England*; and another small Sort of *Frog*, which makes a Noise like *Pack-horse-Bells* all the Spring long. Another little *green Frog*, that will leap prodigiously; which they therefore call the *fly-ing Frog*. There is frequently heard in the *Woods* a shrill sort of Noise, much like that our *Shrew-Mouse* makes, but much sharper; I could never learn the Certainty what it was that made this Noise, it is generally in a Tree, and some have asserted to me, that it was made by the *green Frog*, yet I scarcely believe it. Mr. *Banister* assur'd me, it was made by a sort of *Scarabeus Beetle*, that is I think full as big as the *Humming-Bird*; but neither do I believe that, for this Reason, for I never saw that *Beetle* so low as the *Salts*, but always as high up in the Country as the *Freshes*, and that Noise is frequent all over the Country.

Lizards, that are gray, and very common; the *Snakes* feed much on them, for I have taken several of them out of the Bellies of *Snakes*.

Snakes about 7 several Sorts. The *Rattle Snake*, so call'd from cert in *Rattles* at the end of the *Tail*, these *Rattles* seem like so many perish'd Joynts, being a dry Husk over certain Joynts, and the common Opinion is, that there are as many *Rattles* or Joynts as the *Snake* is Years old. I kill'd 4 or 5, and they had 11, 12 or 13 Joynts each; but the young ones have no *Rattles* of a Year or two; but they may be known notwithstanding, being very regularly diced, or checker'd, black and gray on the Backs. The Old Snake and shiver these *Rattles* with wonderful Nimbleness, when they are any ways disturb'd; their *Bite* is very deadly, yet not always of the same Force, but more or less Mortal accordingly as the *Snake* is in Force or

Vigour; and therefore in *June* or *July* much worse, and more mortal, than in *March* and *April*. This *Snake* is a sort of very majestic Creature, and will scarce meddle with any thing unless provoked; but if any thing offend it, it makes directly at them. An *Indian* being bit by one of these *Snakes* between the *Fingers*, stretched his *Arm* out as high as he could, calling for a *String*, wherewith he bound his *Arm* as hard as possibly he could, and clapt a hot burning *Coal* thereon, and singed it stoutly, whereby he was cured, but look'd *Pale* a long while after. And I believe this truly one of the best *Ways* in the *World* of curing the *Bite* either of *Viper* or *Mad-Dog*. I was with the Honourable *Esquire Boyle*, when he made certain Experiments of curing the *Bite* of *Vipers*, with certain *East-India Snake-Stones*, that were sent him by *King James the Second*, the *Queen*, and some of the Nobility, purposely to have him try their *Virtue* and *Efficacy*. For that End he got some brisk *Vipers*, and made them bite the *Thighs* of certain *Pullets*, and the *Breasts* of others; he apply'd nothing to one of the *Pullets*, and it dyed within 3 *Minutes* and a half, as I remember; but I think they all recover'd to which he apply'd the *Snake-Stones*, though they turned wonderful *Pale*, their *Combs*, &c. immediately; and they became extream sick, and purged within half an *Hour*, and the next *Morning* all their *Flesh* was turned *Green* to a wonder; nevertheless they recovered by *Degrees*. The manner of the Application was only by laying on the *Stone*, and by two cross Bits of a very sticking *Diachylum Plaster* binding it on, which he let not lye on past an *Hour* or two, took the *Stone* off, and put it into *Milk* for some Time; some *Stones* were of much stronger *Virtue* than others. Hereon telling *Mr. Boyle* the Story of this *Indian*, he approved the Method of Cure, and said an actual *Cautery* was the most certain Cure. The *Poison* both of *Viper* and *Mad-Dog* (as I conceive) kill by thickning of the *Blood*, after the manner that *Runnet* congeals *Milk* when they make *Cheese*. *Vipers* and all the viperous Brood, as *Rattle-Snakes*, &c. that are deadly, have I believe their poisonous *Teeth* fistulous, for so I have observed that *Vipers* *Teeth* are, and the *Rattle-Snakes* very remarkable; and therefore they kill so very speedily by injecting the *Poison* through those *Fistulous Teeth* into the very *Mass* of *Blood*. But the *Bite* of *Mad-Dogs* is oft of long Continuance before it get into, and corrupt the *Mass* of *Blood*, being it sticks only to the *Outsides* of the *Teeth*, and therefore when the bite through any thickness of *Cloaths*, it rarely proves *Mortal*, the *Cloaths* wiping the *Poison* off before it come to the *Flesh*. A *Girl* that was bit about *New Year's Day*, continued well till *Whitsontide*, when coming to see certain *Friends* in our *Parts*, she fell very ill, and being a poor *Girl* they came to me; it pleased *God* I recovered her. Some time after, she return'd to give me Thanks for saving her *Life*, being two *Persons* that were bit with the same *Dog* were dead, whilst she remained under Cure, and therefore she was the fullier convinced she ow'd her *Life* to me.

But the *Poison* of *Vipers* seems to be like the injecting of *Liquors* into the *Veins* of *Creatures*; *Dr. Moulin* and I made many Experiments of this Nature together, and I have made many more by my self. We once I remember

ber injected half a Dram of *Allom* into the *Jugular-Vein* of a Dog before the R. Society, (the *Allom* being only dissolved in a little *Water*) which within something less than one Minute's Time was so absolutely dead, as not to have the least Convulsive Motion; and I have done the like with many other things besides *Allom*, but with some Things it is more curdled and broken than with others, and will differ much both as to Colour and Consistence. *Salt-Petre* kills much as quickly as *Allom*; but then the *Blood* in the *Heart* looks very florid, smooth, and even.

In the little time I have spent in these sorts of Experiments, I easily perceive notable Discoveries might be made thereby: One Dog that lived became *Lame* and *Gouty*; another with *Quick-silver* dy'd, in about 16 Weeks time *Consumptive*, and I discovered *Quick-silver* in the impostumated Parts of his *Lungs*.

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Sect. X. 1.

But to return: The *Poison* of *Vipers* and *mad Dogs* I suppose kills by *Thickning* of the *Blood*, as many malignant *Fevers* also do; in all which Cases I look on *Volatile Salts* to be properest *Physick*, as keeping the *Blood* from *congealing*. I had a singular Instance hereof in a Gentleman of *Torkshire*, bit with a *Grey-Hound* on the *Thursday*, not 3 Minutes before the Dog died *Mad*; he bit him in several places of the *Hands*, as he was giving him a *Remedy*. The *Monday* following the Gentleman was very *Ill*, and came to *Wakefield* to an *Apothecary* his Acquaintance, who knowing not what to do desired my Assistance. When I came, the Gentleman could talk, but every 2 or 3 Minutes he had violent *Fits*, and would tell us, when they were over, that his *Brains* worked like *Birm* in an *Ale-Fat*, and seemed to froth up at every *Fit*. The *Apothecary* had no *Volatile-Salt* of *Vipers*, so I took the *Volatile-Salt* of *Amber*, and ordered him 10 Grains in *Treacle-Water* every half Hour; he told me every Dose seem'd to clear his *Brain*, and cool it as perfectly, as if a *Bason* of cold *Water* were pour'd on his *Head*, but it return'd by Degrees again. Having then a *Volatile Salt* by me that vomits very well, I gave him a Dose thereof; it worked very well, and he was very much better after it. I then ordered him to continue the *Volatile Salts* of *Amber* once every 4 Hours, and at each 2 Hours end (that is betwixt) *Spec. Pleres Archonticon* and *Rue* powder'd, ana. gr. 15. whereby he was so well recovered that within 2 Days he would needs go home, and I heard no more of him for half a Year; when I was fetch'd one Morning to him in great Haste. He had been abroad, play'd the Good-Fellow, and in his Return home, having rode a great Days Journey, being wearied and I suppose finding himself indisposed, he staid all Night in our Town, it being fortunately in his way. In the Morning when he should have got up, he could not stand, whereupon the *Apothecary* was sent for, and a *Surgeon* to bleed him, which was accordingly done, but he grew worse; for in this Case I look upon *Bleeding* to be very prejudicial, as well as in most malignant *Fevers*, for thereby the *Spirits* are diminished, and the *Blood* congealed the sooner. When they had done all they could, and the *Symptoms* still increased, they at length sent for me. I never saw a Man or Creature in that *Agony*, all my Life, that I found him in; senseless and *Mad*, when at best, but every Minute

note the fiercest *Shiverings* ran through him; his *Eyes* would first roll and then set, as if ready to start out of his Head; but above all, the *Swelling* and *Lustation* at his *Breast* was as if he would burst, which went off with a prodigious *Sigh*. All this I judge the Effects of the *Heart* labouring to discharge it self of the *stagnating Blood*, and the *nervous Convulsions* as Consequents thereof. And I am the more confirm'd in this, from what I saw in a *Woman* that was bit also with a *Mad-Dog* in the Leg, and fell ill the very Day that she paid the *Chirurgion* for her Cure; and notwithstanding all that could be done, growing worse, they sent for me. I went, and found her with what is call'd *Hydrophobia*: She would look earnestly after *Drink* or *Water*, and seem'd to desire it, but as soon as she began to drink, away it went, be what it would, with the greatest Violence she could possibly fling it. I gave her the *Vomit* hereafter and also before-mention'd, but she got but little of it down, and I had no more with me; nevertheless it so brought her to her self, that she could answer Questions, and I asked her, whether she was afraid of the *Drink* and *Water*, when she flung the Cups in that violent Manner from her? She said, No; but when she offer'd to drink, her *Breast* and *Heart* would not let her. I asked, whether through any *Aversion* or *Fear*? She said, No; she was very thirsty; but when she offered to drink it struck to her Heart, and stopp'd her Breath. That is, as I apprehend, the cold *Drink* passing down the *Throat* struck a *Chilness* in the *Blood*, and made it readier to stagnate; besides, the very *Act* of *Drinking* hindring the *free Breathing*, conduced also much thereto; and therefore the Heart was so suddenly oppressed, that she could not forbear flinging away what ever she had in her Hand. She complained also of a great *Rigour* and *Stiffness* or *Straitness* of the *Muscles* of her *Breast*, so that possibly the *Spirituons Liquor* that flows in the *Genus Nervosum* may be congealed as well as the *Blood*; or the same Effects may be supposed, notwithstanding, to be the Result of the *condensed Blood* clogging both the *Heart* and *Lungs*, so that the *Breast* may seem to be straitned therewith. The same I judge to be the Cause of all the violent *Luxations* in this Gentleman, whose *Fingers* I look'd on, and found the Places where he had been formerly bit turn'd blackish, and much inflamed about them, which confirmed me in my Sentiment, that it was a Relapse of his former Distemper; that is, of the bite of the *Mad-Dog*. I gave him the former *Vomit* of *Volatile Salts*, and he shortly after cried, This Fellow in *Black* has done me Good, and after the first *Vomit* came so to himself, as to know us all. I vomited him every other Day with this *Vomit* for 3 times, and made him in the Interim to take *Volatile Salt* of *Amber*, and the aforesaid Powders, and to wash his Hands, and Sores in a strong *Salt-brine*; to drink *Posset-Drink* with *Sage* and *Rue*, and by this Course and the Blessing of God his Life was saved, and he perfectly Cured, for it is now 4 Years since, and he has had no Relapse. I have cured several others by the same Method.

Col. Spencer, the Secretary of State in Virginia, a very serious and ingenious Gentleman, told me, that his Servant brought him Word once that a

Sow

Sow having Farrow'd, a *Rattle Snake* was got into the den, and had kill'd the Pigs. The Col. went to see the *Snake*, which they said was still coyld in the Den; there followed them 2 or 3 *Mungrel Curs*, and they set one of the *Dogs* at the *Snake*, which was too quick for the *Dog*, and snapt him by the Nose, whereupon he set a *Howling* and ran immediately into the adjacent River, and died very shortly after. Another of the *Dogs* upon the like attempt was bit by the *Snake* also, and fell a *Howling* and *froathing*, and *Tumbling*; but being he died not so soon as the other *Dog*, they fetch'd some of the *Herb* which they call *Dittany*, as having a great Traditionary Vertue for the cure of *Poisons*: they Pounded it, and adding a little *Water*, Expressed the *Juice*, and gave the *Dog* frequently thereof: nevertheless he died within a *Day* or *two*. The *Howling* of the *Dogs*, he suppos'd, gave notice to the *Sow*, and made her come furiously brisling and run immediately into her Den; but being likewise *Bit* by the *Snake*, she set up a terrible Squeak, and ran also into the River and there Died.

A Gentlewoman told me, that a Neighbour being *Bit* by a *Rattle-Snake* Swell'd excessively; some Days afterwards she was sent for, who found him Swell'd beyond what she thought it had been possible for the Skin to contain, and very *Thirsty*. She gave him *Oriental Bezoar* shav'd, with a strong *Decoction* of the aforesaid *Dittany*, whereby she recover'd the Person. Asking him afterwards, what he *Felt* when the *Snake* first bit him? He told me, that it seem'd as if a *Flash* of *Fire* had run through his *Veins*.

Besides the *Rattle-Snake*, there is the *blowing Snake*, and absolute Species of a *Viper*, but larger than I have seen any in *Europe*. It is so call'd because it seems to *Blow* and spread its Head, and *Swell* very much before it bites, which is very deadly. It is remarkable there is none of their *Snakes* there, that make any of that *Hissing* noise that ours in *England* make, but only shoot out their *Tongues* shaking them as ours do, without any noise at all.

There is another sort of deadly *Snake*, call'd the *Red-Snake*; they are and ugly *Dark-brown* Colour, inclining to *Red*; their Bellies are of a more *Dusky-White*, with a large streak of *Vermilion red* on either side; this too is of the *Viper* kind.

The *Horn Snake* is, as they say, another sort of deadly *Snake*; I never saw any of them, unless once, shortly after my Arrival in that Country, which I cannot attest to be the *Horn Snake*, for I could not distinctly view it. It was perch'd up about 2 *Foot* high in a *Sumach* Branch, its Tail twisted about the Shrub, and about a quarter of a *Tard* stood bolt forward, leaning over the Forked Branch thereof. I could not see the *Horn*, which they say it has in its *Front*, whereof it strikes, and if it Wounds is as Deadly as the *Rattle-Snake's Bite*. This I think may not improperly be refer'd to the *Dart-Snake*.

The *Black Snake*, is the largest, I think, of all others, but I am sure the most common; I have kill'd several of them full 6 *Foot* long, their bite is not deem'd *Mortal*, but it Swells and turns to a *Running Sore*; they feed

feed upon *Lizards, Mice, Rats, Frogs, and Toads*, which I have taken out of their Bellies. I was once a *Simpling* in the Woods on a fair Sun-shiny Day when I saw a *Snake* crawling on a Tree that was fallen, and *Licking* with its *Forked Tongue* as it mov'd; I stood still to observe it, and saw it *Lick* up small *Insects* and *Flies*, with wonderful *Nimbleness*, catching them betwixt the *Forks* of its *Tongue*.

The *Corn-Snake*'s most like the *Rattle Snake* of all others in Colour, but the *Chequers* are not so regular, neither has it any *Rattles*. They are most frequent in the *Corn Fields*, and thence I suppose so call'd; the *Bite* is not so *Venemous* as the *Black Snake*'s. The *Water Snake* is a small Snake; I never saw any of them above a *Tard* long, tho' I have sometimes seen 40 or 50 at once. They are of an ugly *Dark Blackish* Colour: They say they are the least *Venemous* of any.

An Account
of Mary land by
Mr. Hugh Jones,
n. 259. p. 439.

XX. *Cheesepeak-Bay*, which runs N. b. W. about 200 *Miles* or more divides *Mary-land* as well as *Virginia* into two Parts, which we call the *Eastern* and *Western Shores*. The whole Province contains 11 *Counties*; 6 on our side, which is the *Western*, and 5 on the *Eastern Shore*. The Land is generally *low* on both sides. No *Hill* that I have have seen or heard of among the *Inhabitants* 50 *Turds* Perpendicular: But about 100 *Miles* West of us, towards the *Heads* of the *Rivers*, the Ground rises and appears in very high *Mountains*, and rocky *Precipices*, running North and South, from the Top of which a Man may have a clear Prospect of *Virginia* and *Mary-land*.

All the *Low-Land* is very *Woody*, like one continu'd *Forest*; no part clear'd but what is clear'd by the *English*: And tho' we are pretty close Seated, yet we cannot see our next Neighbour's House for Trees. Indeed in few *Years* we may expect it otherwise: For the *Tobacco Trade* destroys abundance of *Timber*, both for making of *Hogheads*, and building of *Tobacco-Houses*; besides clearing of Ground Yearly for *Planting*. Our *Soil* is generally *Sandy*, free from *Stone*, which makes it very convenient for travelling; and we have no occasion for *Shoeing* our *Horses*, except in *Frosty* Weather. And what with the Goodness of our little *Horses*, and the Smoothness of the *Roads*, we can travel, upon occasion, 50 *Miles* in a Summer's Afternoon, and sometimes 100 *Miles* in a Day: Indeed our *Miles* are not accounted so long as in *England*. The rich and plentiful Gifts of Nature add much to the Happiness of the place; the three Elements affording plenty of Food for the use of Man, viz. *Deer, Fowl*, both *Water* and *Land*, in abundance: And for the preserving of *Health* many excellent *Herbs* and *Roots*, the discovery of whose Virtue is chiefly owing to the *Indians*.

We have for *Timber*, several sorts of *Oak*, viz. the *Red, White, Black, Chesnut, Water, Spanish* and *Line-Oaks*; which last bears a leaf like a *Willow*. We have also *Cedar White* and *Red*: The *Red* serves only for *Posts* and *Groundsils*, the *White* to rive or split into *Boards*, that being the freest from *Knots*, and goes under the Name of *Cypress*, but I thing falsely. Here is a Tree we call *Cypress*, which is extraordinary large in Bulk, and bears

bears a Leaf like the *Sensitive Plant*: It is soft and spongy; will not rive and is fit for no Use. We have *Black-Walnut*, which is mightily esteem'd by the Joyners for its *Grain* and *Colour*. Here is a sort of *Poplar* that makes good *White Plank*; it is a large Tree, and bears a *Flower* like a *Tulip*. We have also Plenty of *Pine*; and *Dog-wood*, which is a fine *Flower-bearing Tree*; *Sassafras*; *Locust*, a Tree of very Quick Growth, and very durable in Building; *Hickery*, of which we have two sorts, *red* and *white*, this serves chiefly for *Fire-wood*, being the best for that Use. We have also plenty of *Chestnuts* and *Chinquapine* another species of *Chestnut*, and a sort of *Elm*, like a *Dutch Elm*, which we call the *Sugar Tree* from the *Sweetness* of its Juice, with which some have made good *Sugar*. Here is a sort of *Elder*, whose Bark is closely guarded with *Prickles* like those of a *Briar*. *Tulip-bearing-Laurel*, and *Myrtle* of several sorts; one whereof bears a *Berry* with which they make, in the *Eastern Shore*, *Green wax*, very proper to make *Candles* if mix'd with *Tallow*.

Among the Inhabitants of the *Air*, which are very numerous, the *Humming Bird* is the most Curious; they continue with us all Summer, feeding only on *Flowers* like *Bees*: and the *Mocking Bird*, for *Various Notes*, exceeds all the Birds, I believe, in the World.

Of all our *Reptiles*, the *Rattle-Snake* is the most noted; and what is commonly reported of its *charming Birds* and *Squirrels*, &c. is not groundless: for it hath been affirm'd to me by several Eye Witnesses.

The *Air* is now more *wholesome* than formerly: which I suppose proceeds from the opening of the Country, that giving the *Air* a freer Motion: Our *Summers* are not extream *Hot*, as in the first Seating; but our *Winters* are generally *Severe*, towards what they are in *England*. The *North west Wind* is very sharp in Winter, and even in the Heat of Summer it mightily cools the *Air*; and too often at that time a sudden *North-Western* strikes our Labourers into a *Fever*, when they are not careful to provide for it, and put on their Garments while they are at Work.

We have little or no *Woollen* or *Linnen Manufacture* follow'd by any of us, except what is done in *Somerset County* over the *Bay*: But *Tobacco* is our Meat, Drink, Cloathing and *Monies*; not but that we have *Money* both *Spanish* and *English* pretty Plenty, which serves only for *PocketExpences* and not for *Trade*, *Tobacco* being the *Standard* for *Trade*, not only with the Merchants, but also among our selves. Our common *Drink* is *Syder*; which is very good, and where it is rightly order'd not inferior to the best *White wine*. We have *Wine* brought from *Madera* and *Fayal*; *Rum* from *Barbadocs*; *Beer*, *Mault*, and *Wines* from *England*. We have Plenty of good *Grapes* growing *Wild* in the Woods: But there is no Improvement made of them.

We are Govern'd by the same *Laws* as in *England*, only some *Acts of Assembly* we have relating to some particular Cases not under the Verge of the *English Laws*: or where the *Laws of England*, do not so aptly provide for some Circumstances, under which our way of Living hath put us. The Church of *England*, God be praised, is pretty firmly establish'd among

ms. Churches are built, and there is an *Annual Stipend* allow'd to every Minister by a *Perpetual Law*, which is more or less according to the number of Taxables in each *Parish*, every *Christian Male* 16 Years Old, and *Negroes Male and Female* above that Age pay 40 Pound of Tobacco to the Minister, which is levied by the *Sheriff* among the other Publick Levies; which makes the Revenues of the Ministers, one with another, about 20000 Pound of Tobacco, or One hundred Pounds Sterling per Annum. It hath been the Unhappiness of this Country that they have had no Protestant Ministers hardly among them till Governour Nicholson's time (who has been a great Promoter and Encourager of the Clergy) but now and then and Itinerant Preacher of very loose Morals, and Scandalous Behaviour; so that what with such Mens ill Examples, the Roman Priests Cunning, and the Quakers Bigotry, Religion was in a manner turn'd out of Doors. But God be Praised, things now stand better, and our Churches are Crowded as full as they can hold, and the People are pretty sensible of the Roman Superstition, and the Quakers Madness; so that their Parties both joyn'd together are very Inconsiderable to what ours is. Indeed the Quakers struggle hard to maintain their Footing, and their Teachers (especially the Female Sex, who are the most Zealous) are very free of their Taunts and Contumelies against us, but 'tis to little purpose, unless to make their own way more Ridiculous and Odious.

We have not yet found the way of Associating our selves in Towns and Corporations, by reason of the fewness of Handicrafts Men. There are indeed several Places allotted for Towns: But hitherto they are only Titular ones, except Annapolis where the Governour resides. Governour Nicholson has done his endeavour to make a Town of that: There are in it about 40 Dwelling Houses, 7 or 8 whereof can afford good Lodging and Accommodations for Strangers. There is also a State-House, and a Free-School built with Brick, which make a great Shew among a parcel of Wooden Houses, and the Foundation of a Church laid, the only Brick Church in Maryland. They have two Market Days in the Week; and had Governour Nicholson continued there some Years longer, he had brought it to some Perfection.

As for our Predecessors, the Indians, I cannot give you at present any further Account of them than this, viz. That whereas at the first seating of Maryland there were several Nations of Indians in the Country, Govern'd by several petty Kings: now I do not think that there are 500 Fighting Men of them in the Province; and those are most on the Eastern Shore, where they have 2 or 3 little Towns. Some of them come over to over side in Winter-time to Hunt for Deer, being generally employ'd by the English; they take delight in nothing else: and it is rare that any of them will embrace our Way of Living or Worship. The cause of their Diminishing proceeded not from any Wars with the English; for we have had none with them: but from their own perpetual Discords, and Wars among themselves. The Female Sex also have swept away a great many; so that now they are Dwindled almost to nothing. One thing is Observable in them, tho' they are

are a People very timorous and cowardly in Fight, yet when taken Prisoners and Condemn'd, they'll dye like Heroes; braving the most exquisite Tortures that can be invented, and singing all the time they are upon the Rack.

XXI. The *Gramen Ischamon*, call'd by others *Gramen Dactyloides*, or *Sanguinella*; and the *Gramen Aquaticum cum Longissima Pannicula*, mention'd by *Baubinus*, grow here (about Frankfort on the Oder) in great Plenty. In the Forest, call'd the *Hartz*, there are very considerable both Copper and Silver-Mines; store of *Lapis Fissilis*, and a sort of Stone, which by Rain grows altogether soft; and a Place call'd *Bowman's Hole*, like that of *Ok-Hole* about Wells in England.

*Observables made
Frankfort on the
Oder, by Jöhl
Chr. Peckman.
n. 39. p. 773.*

XXII. *S. Borelli*, pretends to have lighted upon a way of building Gallies with several Tires of Oars, of different Heights, which he esteems to be more convenient, more speedy, and stronger than those that are now in Use. He thinks also, that he can give an Account of the Possibility of the Gallies of the Ancients to a determinate Number of Tires.

*Some Commu-
nications from
Italy, by . . .
n. 114. p. 309.*

There is at Rome a Bowl, which is so counterpois'd, that it can stop of it self upon an inclining Plane like *Kepler's Watch*. It stops upon all sorts of Matter, and even upon a *Looking Glass*.

XXIII. I took Notice in the University of *Bononia* of this Inscription made in Commendation of the deservedly famous *Malpighi*. It is in the upper Gallery in a large *Basis* painted in *Fresco*, with some Figures about it.

*Observations in
Italy, by Dr. Pet.
Silvester n. 265.
p. 627.*

D. O. M.

Virtuti & Fama in Ævum mansura Incliti Viri M. Malpighii, Medicinæ Professoris Celeberrimi, utraque Artistarum Universitas P. Anno Salutis. 1683.

And a little Lower,

*Miraris Breve Lemma? Nomen Ingens ornari negat; est satis Referrî.
Jussum Cætera tacere Marmor. Omnis Malpighium loquetur Ætas.*

I have made some Observations upon the *Bronchocele*, a Distemper very frequent all over *Lombardy*, and *Savoy*. By the Disposition of this Tumor, I am satisfy'd it has principally its Seat in the *Glandula Thyroidea*, and sometimes too, but very seldom, in the *Parotis Conglobata*. I could plainly see the *Parotides Conglomerata* were no wise concern'd. This I have observ'd in several *Bronchoceles* of a very great Bigness. I conceive these Tumors (that are generally attributed to the Water the People drink that is melted Snow) do proceed a *Lentore Lympha*, which by Degrees extend the *Folliculi Glandularum Membranosi*, and being there congeal'd, hardens them to that Degree, that an inveterate *Bronchocele* is almost like a Stone. But why these Swellings are to be seen no where else, but in these

H h h h 2

Glands

Glands of the Neck, it is difficult to give a good Reason. It may be the natural Conformation of the *Glandula Thyroidea*, (which being harder and of a more solid Substance than other *Glands*, give sooner a stop to the *Lympha Lenta & Viscida*) is the occasion of this *Tumor*'s always beginning and settling there.

The *Sal montis Vesuvii* is found in pretty large Lumps after Mount *Vesuvius* has spew'd out a vast Quantity of *Ashes*. The great Rains that fall upon these *Ashes* make a sort of *Lees*, which left in the hollow Places are evaporated by the Heat of the Sun, and there remains this *Urinous Salt*, whose Taste is something like *Sal Almoniac*.

At the *Sulfatara* between *Naples* and *Puzzolo* they make *Allum* in this manner: In Summer time they gather as much as they have Occasion for, of an *Earth* that is there in the middle of a large *Area*, and they keep it in a dry Place. They put it in *Lead-Coppers* of a good Thickness, and pour upon it *Rain-Water*, which is also impregnated with the same *Mineral*; for that purpose they take great Care to dig some large Holes to preserve in them the *Rain-Water*, and they carry it to a large Cistern by the *Coppers*. They take away the *Earth* when the *Lixivium* is made, and as it grows stronger by Evaporation, they put it from one *Copper* into another, till it is sufficiently evaporated. Then they take it out and convey it into a wooden Tub, where, after it is cool'd, you see the *Allum* stick to the sides in the form of *Chrystals*. But the most remarkable thing is, that these *Coppers* are placed upon some of the great *Spiracula*; and that without any Expence in Fuel, only by the violent Heat of these *Effluvia*, the Evaporation is constantly made sufficient for that *Chrystallization*. All this *Laboratory* where are the *Coppers* and the *Cistern*, with the *Tubs* is only tiled over. The Governours of the great *Hospital* of the *Annunciata*, who have been at the Charge of this ingenious Contrivance, do make now about 3 or 400 Pounds a Year by it.

All Summer long some Labourers dig up and down in several Places of the same *Area*, as it was in a Kitchen-Garden; and by those Means they give way to the copious *Sulphureous Steams*, that are within the Bowels of all this Mountain. Then out of the Superficies of that *Earth*, by the means of *Earthen-Pots*, they sublime the *Brimstone*.

At the Mouth of the largest *Spiracula*, where is an excessive Heat and continual Noise and Smoke, is found a sort of a *Native Sal Almoniac*. It seems the copious *Steams* come out in *Forma Liquida*; for if you put in a Key, a Sword, or any thing solid, these *Effluvia* will stick immediately to it, and drop down like Water. All this Mountain ought to be extraordinary full of *Mineral Substances*; for we see these *Effluvia* when they are sublimed to the Top of the *Spiracula*, do stick there to Tiles or Stones, where they form this *Salt*; of which they gather Yearly about 200 Pound Weight. It has much of the Taste of the *Fetidious Sal Armoniac*; and as a learned Physician told me, being distill'd in a Sand Furnace, it yields a *Volatile Urinous Spirit* absolutely like *Sal Armoniac*, as to the sensible Qualities, and all other Effects: He only observ'd that *Spirit* had

had something *Aluminous* in it, and that to correct it they used to add a greater Quantity of *Quick-Lime*, or *Sal Tartari*, than in the common *Spirit's* Distillations.

XXIV. 1. There is an Hill nigh *Sarvizza*, two Days Journey on this side *Larissa*, which consists of an *Earth* of a fine red Colour, out of which the red *Earthen Vessels* of that Country are made; as also a great Number of *Acidula* nigh *Transchin* in *Hungary*, there being 32 plentiful Springs of them; likewise an *Hot-Bath* nigh *Bellachergua* in *Bulgaria*, scituated far from any Habitation, yet well built by the *Turks*, and very refreshing to Travellers. It hath a red *Sediment*, and maketh a gray *Stone*.

*Observations in
Turkey by Dr
Edw. Brown.
n. 59. p. 1051.*

Being at *Larissa* in *Thessaly*, where the *Gr. Signor* hath long resided, I understood that he had pass'd a good part of the hot Summer of 1669, upon the neighbouring Mount *Olympus*; and by the Interpreters to the *Emperor's* Resident, the *Illustriss. Signor di Casa nova*, who were oblig'd to attend the *Sultan* upon the Mountain) I was inform'd, that there was a *Spring* of *whitish Water* upon that Hill, which was drunk of by many Persons in the great Heat and Thirst, contracted by ascending the Mountain, but prov'd very destructive to them in 3 Days; they then complaining of an Heaviness and Coldness of their *Stomachs* till they dy'd.

2. There is a Disease which reigns in the Country about *Aleppo*, and as far as *Bagdat*, invading both *Sexes*, all sorts of *Ages*, and Strangers as well as Natives. 'Tis commonly call'd *Il mal d' Aleppo*, and appears to be in the *Skin* a small *Pustula* or *Wheal*, Hard and Red, the Head whereof is scarce bigger at the Beginning than the Point of a Pin; afterwards growing bigger, and being nourisht by 5 or 6 little Roots or Fibres, it goes on to its Height for the space of about 6 Months, and in as many more comes to its Declination; so that the whole Period of this Disease is generally comprisd within the space of one Year. But this *Pustula* hath hitherto yielded to no Remedies, neither in the Beginning, Middle or Declination; but hath rather been exasperated by them, though they were *Anodyna*. It is wholly to be left to Nature; and if you do, there is no Pain or Trouble in it. It takes Peopld not once, but often; and it seizeth on several Parts of the Body; and if it do so on the Face (as often it doth) it causes a remarkable *Scar*, which yet by little and little vanisheth.

As to *Fevers* at and about *Aleppo*, though they have the same Type there as in *England*; yet there are two Things peculiar in them. One is that in acute *Fevers*, cold Sweat commonly signifies Recovery, but hot Sweat portends Death. The other is, that in such acute *Fevers* even an intermitting Pulse denounces no Danger.

Touching the *Leprosy*, which was anciently so frequent a Malady in these Countries, 'tis now scarce to be found there; though at *Damascus* there is still an *Hospital* standing, formerly built for the Relief of Persons thus diseased.

As for the Reason, why the City of *Constantinople* is so much subject to the *Plague*; some are of Opinion, that the Multitude of *Slaves*, Yearly brought

brought by the *Black-Sea*, and their hard Diet and Usage, begets this Corruption. Others judge, That the Commonalty there, feeding, for the greatest part of Summer, on *Cucumbers* and *Melons*, and drinking Water upon them, without the use of Helps to correct the Crudities, fall into *Malignant* and *pestilential Fevers*. But the Physicians generally conclude, That the *Air* of *Constantinople* is infected by the *North-East-Winds*, which blow commonly for 3 *Months*, beginning about the *Summer Solstice*, arising from unwholsome Marshes in *Tartary* and *Muscovy*, and passing over the *Black-Sea*, (a Place known to abound with *Fogs*) bring with them certain Dispositions tending to Corruption; which working upon Bodies already prepared by bad Diet, may well be judg'd, they say, to be the Cause of this Distemper.

Besides the other Uses of *Opium* in *Turky*, 'tis common in *Arabia* to cure Horses with it of the Gripping of the Guts.

As to the *Turky* way of dressing *Leather*, it is to be observ'd, that their *Leather* is nothing so strong and serviceable as that in *England*; an assur'd Proof whereof is the wearing. And though it be commonly reported, that the *Leather* in these Parts, though thin and supple, will hold out Water; yet this is to be understood, that the *Turks* in their *Winter-Boots*, between the Lining and the *Leather*, put a *Sear-Cloth*, which being curiously sew'd in the Seams, will keep out Water, though you put them in it for divers *Hours* together. In cleaning of their *Leather*, they use *Lime* and *Album Gracum*; and instead of *Bark* of *Trees*, they employ *Valonia*, a sort of *Acorn* growing on the *Oaks*. I am perswaded that our *Acorns* in *England*, if they could be spar'd for it, would perform the like Effect, and perhaps better, seeing that many Times the *Valonia* burns the *Leather* so much, as to make it little serviceable; whereas our *Acorns* are probably more temperate, and so might better serve the Turn.

Medical Observations in the Northern Countries; by Dr. Phil. Lloyd. n. 256. p. 310

XXV. *Balnea* nuspian frequentiora sunt quam in *Lithuania*: *Balneum* ingressi postquam largiter Sudarunt, *Cucurbitas* sibi apponi faciunt, aut virgis Tergum cadunt usque ad insignem Ruborum. Inter *Cosacos* quoque si quis graviter infirmatur, *Balneum* ingreditur, & Corpus tegunt certis Herbis, Partique Dolenti applicant certum *Cornu Cavum* ad Vesicam attrahendam, quâ rupta effluit *Ichor* varii sæpe Coloris, *Flavi*, *Viridis*, & *Nigri*, & *Patiens* convalescit: Varietas autem ista *Colorum*, Herbis quibus *Patiens* tegitur, aut *Cornu Fuco* aliquo imbuto adscribi debet. *Cosacorum* quoque Cura multum in *Aqua Vitis*, aut *Jusculis Acidis* cum *Oleo* & *Pipere* ad *Sudorem* eliciendum consistit: nec abstinent in *Dieta* à Carnibus cum *Aceto* & *Capis* coctis, quod *Bigost* vocant. Sicuti autem istæ Nationes *Pharmaceutica* non multum æstimant, ita vice versa sunt prodigales quoad ea quæ ex Fonte *Chirurgico* petuntur, ut *Ven. Sect.* usum *Sanguisugarum* (quas etiam *Palato* & *Gingivis* intro applicant) *Fonticulos*, & *Trepanationem*; cujus usus est valde frequens in *Suecia* bono cum successu: habent enim *Sueci* Capita satis Dura & Ursina. Apud *Muscovitas* usus *Herbæ Theæ* ob viciniam cum *Chinenfibus*

Chinenſibus frequens eſt non ſolum in Decocto ſed in Subſtantia Pulverifatam ſumunt pondere ꝛſſ cum *Aqua Vita*.

Sunt apud ipſos *Pastilli* certi Odoriſeri & Flavi Coloris in uſu : per Nares attrahunt pondere *Gr. iv.* Ore aperto. Per duas Horas tanta copia *Muci Viſcidi* rejicitur, quantum vix *Catharticum* eliminare poſſit : quo Remedio curant omnes Affectus Capitis à Frigida cauſa ortos. Aliqui hauriunt fumum *Tabaci*, non per vices, ſed ſimul & ſemel, ex Tubulo capaci de hoc Fumo quantam poſſunt Deglutiendo : tunc corruunt in Terram non aliter quam *Apoplexia* Taſti; Somnum abbreviat Superveniens Vomitus & Alvi perturbatio : quod etiamſi non ſuperveniat, poſtquam expergiscuntur Capitis levamen Sentiunt, & ſunt ad omnia bene diſpoſiti.

Natio *Tartarorum* ut plurimum à Teneris Lactis & Carnis *Equinae* pabulo affueta, in continuis Equitationibus *Medicinam* quaerens : præter Externa eaque *Empyrica*, pauca Interna excolit Remedia; v. g. dum quis graviter infirmatur, & eſt ſuſpicio *Febris Malignae*, tunc capiunt *Lepuſculum* juvenem, cui incidunt *Arteriam Carotidem*, & Sanguinem fugit Ager quamdiu poterit : poſtea Pelle detracta & calente tegit Caput, ſequæ ad Sudorem & Somnum diſponit. Dum quis ex Captivis aut Servis *Febri* corripitur, tunc apprehenſa Comâ ipſum aliquantiſper exagitantes & circumrotantes in Aquam profluentem projiciunt, hocque modo Humores & Spiritus alterando procurant *Febrifugium*.

Hæc ſunt quæ ab Amico in Caſtris accepi, qui diu verſabatur in locis iſtis *Septentrionalibus* : idem mihi retulit *Coronidis* loco dari *Obſcinationem*, ſolo Aſpectu inductam, in *Lithuania* præſertim (credat qui vult) ubi Homines Effluviis Subtilibus ex Oculis emanantibus non modo aliis noceant, ſed etiam Animalibus. Hoc Mali genus *Uroki* appellatur : ad quem effectum producendum requiritur Approximatio Corporum viciniſſima, & deinde ne alter altero ſtet notabiliter editiore loco. Curantur tales precipue Balneo, *Origano*, *Hyperico*, aliisque Herbis parato; Suffumigio ex *Crinibus*, *Unguibus*, aliisque Partibus ipſius Obſcinatoris, ſi fieri poteſt, & demum Sudoribus.

Inter *Tartaros*, ſi quis ex Equo vel alias Graviorem paſſus eſt Caſum, ante omnia illum ſtimulant ad *Urinam*, dein *Vena Sectâ* Oſſa Equorum combuſta, vel certum *Albi Boli* genus, quo Terra illa abunda, ad ebibendum præbent.

Lac Equinum Acidum factum eſt illis Univerſale omnibus Morbis Calidis refrigerium, imo *Balsamicum Stomachale*.

In *Variolis* Infantum, loco *Vena Sect.* apponunt *Moscovita Cucurbitulas* Scarificatas Clunibus, ſubinde *Sanguisugas*; *Emulſiones* parant ex Semine *Napi*; Hauſtui imponunt *Album Gracum*.

Poloni habent certum Medicamentum Alimentoſum ipſis familiare, *Barſt* dictum, quod Fermentum Stomachale Acido ſuo ſuaviter reſtaurat, & *Polonica* Nationis Crapulis, ex largiori Cremati Mulſi & Vini Generoſi hauſtu, vel ex Ciborum Calidorum copiâ contractas, conveniens : hoc Edulii Medicamentoſi genus ex *Branca Urſina*, vel ex Solo Pane Siligineo fermentato ſuo modo, conficere norunt in forma Decocti Herbacei Aquoſi.

Cæterum :

Cæterum si quis Infirmari incipit, & conqueritur de ingenti *Capitis Dolore*, *Torminibus Ventris*, *Arthritide vagâ*, &c. Statim formatur suspicio de *Plica*, five *Koltum*: nihil aliud satagunt quam *Plicam* in *Capitis Capillis* procurare; id quod Lotione ex *Brançâ Ursinâ* aliisque Herbis, vel saltem mixturâ *Olei & Vini* sæpius Lavando Caput, efficiunt. *Plicâ* ita procuratâ in Capite, videtur ipse Morbus mitescere, Materiâ Morbificâ criticè sic translatâ, & Naturæ totum relinquitur Opus: quod plane indicat hunc Morbum ab alia Causa quam neglectu *Pectinationis* produci. Siquis *Pectinando* Divellere, aut Capillos Abscindere tentat, in alium incidet Morbum, & Sanguis sæpe effluit tanquam ex *Vena* Ramulis Pilis abscissis, nec mirum hoc videri debet, cum *Pili* ex *Arteria*, *Vena*, & *Nervorum* Ramulis, in Capsula inclusis, & postea extensis formentur; ut patet *Autopsia*, ope *Microscopii*, in Pilis *Barbæ Felis* aliorumque Animalium,

Quicquid de Causa *Plica* tradunt Authores vel nimis Genericum est, vel Imperfectum, & Insufficiens: nam quod ad Aquas in *Russia* spectat, & si certum sit ex illarum Haustu causari; unde etiam dum Exercitus Militaris illas Partes transit ad Aquarum istarum Vada alii stant Vigiles Milites transeuntibus prohibitori ne Similes Aquas hauriant: Quæritur quomodo illi qui ad 100 *Leucas* inde diffusi habitant, & ultra *Plicâ* corripuntur? nisi forte nobis persuadeamus Aquæ illius ex *Russia* Venas propagari per totam *Poloniam*.

Causa Intrinsicca in *Glandulis* subcutaneis constitui potest, quo modo plures earundem Ductus & Pori conjuncti sunt ac obliqui, ex quibus deinde *Pili* Copiosiores angustiore in loco positi, accedente simul *Glandularum* Succo nimis viscido, intrlicantur & Complicantur: sed & ista Causa, cum extra *Poloniam* dari possit, ad Morbi *Endemii* Naturam sola non sufficit. Quamobrem causa adæquata partim in *Contagio*, partim Rerum non-naturalium usu incongruo, quærenda, De *Contagio* non dubitandum, cum Familiare sit Itinerantibus Lectos secum circumvehere; Aer satis Rigidus Boreali acido coagulante abundat, unde Transpiratio Pituitæ illius Glutinosæ circa *Pilorum* Radices hærentis facilè impeditur, vel maximè dum *Poloni* nudato Capite frequenter incedere consueverunt.

Laborantes hoc Morbo habent Appetitum in certum Objectum defixum; alii solam Aquam expetunt, alii crematum, alia potulenta averfantes: ex similibus Remediis in *Scorbuto* juvantur.

Præter *Febrem Malignam Hungaricam* dictam, occurrunt alii Morbi Ievioris momenti *Endemii*, ut *Czemer*, *Porcellus Cassoviensis*, *Struma*.

Czemer est Tumor aliquis sub *Carpis Mannum* à Latere supra *Arterias*, ad instar Nodi alicujus mollioris, Dolorem dum tangitur excitans. Curatur *Emetico* & *Sudoriferis*.

Porcellus Cassoviensis est Tumor Durus instar *Porcelli*, Regioni *Lienis* incumbens, Incolis Cavitatis *Cassoviensis* familiaris, estque *Schirrofa* Dispositio *Lienis* cum Flatibus *Colon* obsidentibus. Curatur *Aperitivis*.

Strumosi in *Hungaria* non reperiuntur nisi circa Montanas Cavitates, ubi *Auri* sunt *Fodina*, propter Aquas *Mercuriales* & Effluvia Mineralium. De crescente

crescente Luna Spongia combusta Fumum Ore excipiunt Strumefi, & residuum Cinerem Melli admixtum devorare solent in Principio; nam Struma Inveterata nullam admittunt Curam.

XXVI. In *Iceland*, our *Air* is very Healthy all the Year long. The diseases which the Inhabitants are most subject to, are the *Cholick* and *Leprosie*. We have no *Physicians*; only 2 or 3 *Chirurgeons*, that furnish us with some *Plaisters* for the dressing of Wounds. In our *Air* Iron rusts very soon.

The Account
Iceland, by Dr.
Paulus Bjornsonius
n. 111. p. 238.

The Changes of the *Weather* are uncertain, nor do they fall out according to the 4 Seasons of the Year; sometimes it *Snows* as well as it *Hails* in the midst of the Summer: and the Winds Blow now and then most Furiously at the Season.

As to the *Frost*, it penetrates at most 4 Foot in the Earth. *Spirit of Wine* and *Oil* is free from being *Frozen*, much more *Quick-silver*. We preserve our *Fish* from Putrefaction by Burying them in the *Snow*. Bodies *Frozen* do Swell, and are Changed in Taste and Colour. The Figure of the *Snow* is various, and so is its Size. *Hail* is roundish; the greatest is only of the bigness of *Hail-Shot*, that we kill Fowl with.

Of *Meteors* I have observed the *Ignis Lambens*, the *Draco Volans*, and frequently 2 *Mock-Suns*, with 3 *Rainbows* passing through them and the true Sun. We have no *stated Winds*.

The *Depth* of our *Sea* varieth, the greatest about our Coast is 80 Fathoms. Our *Sea Water* in Clear Nights being struck with Oars, *Shineth* like Fire bursting out of a Furnace. The *Tides* observe the Motion of the Moon: The *Sea Swells* about the Moon's Rising and Setting; and it *Falls* when she is Southerly and Northerly. The ordinary *Highest Tides* are not above 16 Foot, except in Autumn, when 'tis very Tempestuous, and when they Rise sometimes to 20 Foot. About the Full and New Moon are the *Highest Spring-Tides* and the lowest *Ebbs*.

As for *Lakes* and *Springs*; of the former we have many, and most of them on High Mountains, which are stored with *Salmons*: Of the latter we have Innumerable, gushing out of Rocks. We abound also with *Hot-Springs*, of which some are so Hot, that in a Quarter of an Hour they will sufficiently Boil great pieces of *Beef*; which is thus ordered: They hang the Kettles, with cold Water, over them, in which they put the Meat to be Boiled; for fear of either Burning or throwing up the Meat by the Fervent and Vehement Ebullition of the *Hot Waters*. The Waters do harden and *Petresce* about the brims of the *Therma*.

Our *Highest Hills* are not above a Quarter of a German Mile high; which how I have measured, I shall give an Account of hereafter. There is a whole ridge of Mountains through all the Island. Our People live only in the Vallies, and towards the Sea-shore. There are other *Ignivomous* Mountains besides *Hecla*; yet all covered with *Snow*.

The Declination of the Load-stone is here to the North West.

Our Soil is Clayie for the most part; in some places, Sandy; no where Chalky. No Tillage at all; We are served by imported Commodities, of which the chief are, Barly, Wheat, Linnen, Iron.

Touching Animals, We have great Number of divers Birds in Summer: In Winter, Ravens, Eagles, Wild-Ducks, Swans.

We are pretty well stor'd with Horses, Oxen, Cows, Sheep, Dogs, and in some places with Hens. Foxes there are in the Mountains; and when the Greenland-Ice comes upon us, that brings with it those terrible Guests, that do us much mischief, I mean, a great many Bears. Our Oxen and Cows live in Winter upon Hay; but our Horse and Sheep make a shift to live upon the Grass under the Snow, and the Coralin-mosse call'd the *Muscus Marinus*.

We have no Minerals, that we know; only store of Brimstone, of which we send out every Year 2 Ships Lading.

In the Year 1642. on the 13th of May, all the Sea, which beats upon our Promontories, was for 2 days so Pellucid and Shining, that Shells and the least Stonies could be seen at the Bottom, where the Sea was 40 Fathoms Deep, in so much that the said Object seem'd to be no further than 3 Foot distant from the sides of our Fishermens Boats; who, when they saw it, were so frighted at it, that they presently came in, and noised this all over the Country. It began in the Morning about 9 of the Clock: and the whole is witnessed by divers very Honest and Credible Men.

A Summary
Relation of the
Discoveries along
the North East-
Passage; by ...
M. 118. p. 417

XXVII. It is sufficiently known how Studiously and Solicitously the Lords of the United Netherlands have labour'd to Encourage those that should first discover a more compendious and shorter Passage by the North to China, Japan, and other Oriental Countries. But those who First Adventur'd upon this Enterprise, found by sad Experience, that the Success answer'd not their Expectation and Hopes.

Vid. sup. Vol. I.
Cap. VIII. Sect.
XXXIII.

Those who immediately Succeeded them in that Adventure, were not much more Successful: For treading the same Steps that the former had done, they were Invovl'd in the same Difficulties; For they were all misled by an Opinion, That that part of the Sea which lieth betwixt Nova Zembla and the Continent of Tartary, had been Passable, and that they might have Sail'd through that to China. But the Arm of the Sea, into which Men pass through the Streights of Weygatz, is too strongly bound up by the Frost, especially in the Winter season. Nor ought any Man to wonder, why the Navigation of Will. Barentz (otherwise a well experienc'd Mariner) was Unsuccessful, who pass'd along the Coast of Nova Zembla, as far as the 77th Degree of Northern Latitude: For it is well known to all that Sail Northward, that most of these Northern Coasts are Frozen up many Leagues, though in the open Sea it is not so: no, not under the Pole it self, unless by Accident; as when, for Example, upon the approach of the Summer, the Frost breaketh, and the Ice, which was congeal'd near 40 or 50 Leagues to the Shore, Breaks off from the Land and floats up and down

down in the Sea; whereby several have been forc'd to quit their Design, and stand back for their own Country.

There was, some Years since, a knot of Merchants of *Amsterdam*, who attempted those Seas with much better Success than the former: For being advanc'd to the 79th or 80th Degree of Northern Latitude, they pass'd above an Hundred Leagues above *Nova Zembla* towards the East. And, though they gave strict Charge to conceal what they had seen and observ'd, yet it became publickly known, that they had discover'd a Sea, beyond *Nova Zembla*, free from all Ice, and very convenient for Navigation.

These being return'd to their own Country, with great Hopes of finding Encouragement to make further Discoveries, petition'd the Lords the States General of the united Provinces, That, since they had granted the Trade of almost all the World to the Governours of the *East* and *West-Indian Companies*, and that there remain'd scarce any thing to the rest of the Merchants, besides the Trade of the *Mediterranean* and *Baltick Seas*, they would be pleas'd to grant the Navigation of the *Northern Seas*, and of the *Eastern* (not yet discover'd) to them, exclusive to the *East* and *West-Indian Companies*. But the Governours of the *East-Indian Company* being sensible how nearly this concern'd them, presented likewise their cross Petition, desiring that the Petition of the said Merchants might for the future be referred to them and their Consideration.

The Merchants finding their Petition thus crossed, address themselves to the King of *Denmark*, who immediately granted their Demands. Under his Protection therefore they equipp'd 2 or 3 Ships, such as they judg'd most proper for this Voyage. Which when the Governours of the *Dutch East-Indian Company* had Information of, they rais'd a considerable Sum of Money, and easily perswaded the Mariners to desist from so dangerous (for so they represented it) a Voyage; and yet that the Merchant might have no just Cause to complain against the said Company, the Mariners went to Sea; but neglecting the Directions and Orders of those Merchants, they steer'd their Course directly for *Spitzberg*, took in their Lading of *Fish*, and return'd Home.

Upon which the *East-Indian Company* of the united Netherlands omitted neither Study nor Care, to find out a Passage through the *North Eastern Sea* for those that were to return into *Europe* from the *East-Indies*. There was then much Discourse of the *Gulf of Anian*, by which a Passage was said to be open into the *Tartarian Sea*; and something they understood from the People of *Japan* and the *Portugueses*, of the Country of *Jezzo*, which lay above *Japan*. But not resting satisfy'd with the bare Relation, in the Years 52 and 53 they sent out some dextrous Persons to discover those Coasts; who passing beyond *Japan*, in the 50th Degree of Northern Latitude, arriv'd upon the Coast of *Jezzo*, where they fell into a narrow Sea, yet broad and convenient enough to lead into the *Northern Ocean*. The opposite Shores they call'd *Het Campagnie Land*, and an Island seated in the middle of the *Gulf* they call'd *Het Staten Eyland*.

Whether this Land of *Fezzo* be annex'd to *Japan* or not, the Inhabitants of both Countries doubt, because vast and inaccessible Mountains interpose, which hinder the Communication. Neither doth it as yet clearly appear, whether this Land of *Fezzo* is a part of *Tartary*, or whether by an Arm of the Sea divided from it. The *Chinese* affirm, That *Tartary* runs 300 *China Leagues* Eastward beyond their famous Wall: So that, if we follow these, the Country of *Fezzo* and *Japan* may seem to be annex'd to *Tartary*. But those of *Fezzo* say, That there runs an Arm of Sea betwixt them and *Tartary*: Which Opinion may seem to receive some Confirmation from what these *Hollanders* affirm, who shipwreck'd (some Years since) upon *Corea* a *Peninsule* of *China*; they say, They saw there a *Whale*, upon whose Back stuck a *Harping-Iron* of *Gascony*. And the Credit of this Assertion not being question'd by any, it is most probable to be conjectur'd that this *Whale* pass'd from *Spitzberg* thorough the nearest Arm of the Sea, rather than through the more Remote. Be it how it will, we may hence safely conclude, that the Sea which lies beyond *Japan* and *Spitzberg* is *Passable*; and that through more perhaps than one Arm or Channel by which they communicate.

But to go on: After the Experiments made by the Governours of the *East-India Company*, in the Year 52 and 53, they resolv'd to proceed no further upon the Discovery; as well because the Emperour of *Japan* interdicted the Navigation of Foreigners into *Fezzo*, in regard (as they say) of the vast Tribute which he raiseth annually upon the *Silver Mines* there, as because they think, it may little conduce to their Advantage, to have this compendious way of Navigation discovered. And therefore they have thought fit to prohibit all farther Search into the Navigation to *Fezzo*, and the Countries adjacent; upon which very Reason they have also endeavour'd to conceal their *aussral Plantations*.

Now concerning that Tract or Space which lieth betwixt *Spitzberg*, *Nova-Zembla*, and the *Streights* of *Fezzo*, we have no Reason, for ought I see, to entertain any Doubt; because many of the *Muscovite* Itineraries assure us, that the Coast of *Tartary* runs not Northward from *Nova Zembla*, but turns up very much towards the East; so that the head Land of *Nova-Zembla* is far the most Northern part of all *Tartary*. This may likewise be collected out of the Histories and Maps of *China*, which affirm, that those which pass from the Wall of *China* Northward, may in the Space of 14 Days reach the Sea. And the Coast of *Tartary*, which lies beyond the *Samojeds*, sufficiently testifieth the Neighbourhood of the Sea, for as much as the further any Man advanceth towards the East, the *Muscovites* have there observed large and navigable Rivers, and fair Cities abounding with plenty of all manner of Things.

It remains now, that we should, enquire by what Course, and in what Season of the Year this Voyage is chiefly to be undertaken? It is hardly to be doubted, but that the *Streight* which lies betwixt *Spitzberg* and *Nova Zembla* may be pass'd; and the Course is to be directed to 78, 79, and even to the 80th Degree of Northern Latitude. If any Man shall, holding the
same

same Course, proceed farther, he will find the Passage shorter; for, if we draw a Line to pass from our Seas through the 78th or 79th Degree of Latitude to the Streight of Jezzoo, it will be very near a straight Line: But if any would from the same Degree of Latitude (having passed Nova-Zembla) chuse to decline toward the Coast of Tartary, and Coast along by it till he meet with some Streight, he would find his Course somewhat longer, but peradventure safer and better; since many Streights would seasonably present themselves to him; and he might safely neglect the Measure of Longitude, which in open Seas (and especially those that are near the Pole) is found difficult to be observed. Neither ought this to be any hindrance, but that the other may be frequented; for, though in Places near the Pole, the Moments of Longitude have great Variety in a little Space; yet there ariseth not any great Difficulty from thence; since the Fault may more easily be rectify'd in lesser Circles: For the Errour cannot be very great, which falls out in Longitudes so much contracted.

As to the Time of the Year, wherein this Navigation ought to begin; it may be consider'd two Ways. In the beginning of the Spring, viz. in the Month of March, it is confess'd by most Men, that the Winds and Seas are favourable to those that sail to Spitzberg, and the Places near the Pole, and that they may run all that Course from these Parts in 12, or 13 Days space; but when they have pass'd so far, if any Man would design to sail to the Streights of Jezzoo, he must steer his Course towards the South: But then these Motions of the Winds and Seas, which were favourable to those who sail'd Northward, will be contrary to those who stand Southward; and they may long enough expect Northern Gales, which seldom blow till towards the latter end of Summer, viz. in the Month of August. If therefore any Man would contrive to dispatch his Voyage in the shortest Time, it were his safest Rule to make Choice of that Time of the Year, wherein he might soonest make to Spitzberg to and again, which I conceive would be in the beginning of Summer; yet it would be safer to set out sooner, if the Wind permit. And although this Course should happily succeed, it follows not, that I should advise them to observe the same in their Return homeward; for, things of that Nature must be left to the Prudence and Conduct of discreet Pilots and Mariners; who are yet to be advertised, that, since the greatest part of this Navigation is to be sought through unknown Seas, they shun, as much as in them lyeth, all near Approach to the Coasts and Islands which they shall encounter, for fear of the Ice; and that they may always make Choice of the most open Seas, which are least infested with it, and in which the Colds are most moderate. For, Experience hath sufficiently taught, that whole large Seas are never known to be frozen, but the Borders of the Seas near Land only, and these by Reason of the Plenty of fresh Waters that run into the Ocean, or the Snows melted in it. And the same Experience hath taught, that there is not that Danger from the fluctuating Ice, as is vulgarly apprehended, especially in Seas not subject to violent Storms, and within the 6th or rather the 8th Month of the Year.

When

When the Nature of this Sea and of its several Streights shall be more perfectly discover'd, it is not to be doubted, but that the whole Voyage betwixt us and *Japan* may be perform'd in the space of 5 or 6 *Weeks*, at the most. But in case it should either by Accident or gross Error, so fall out, that the Ships should be forc'd to *Winter* there before they could recover Home, this likewise might be done without much Danger; provided that they avoided the unadvised Proceeding of the *Dutch*, who being caught, and necessitated to pass the *Winter* in the most Northern Climates, planted themselves there upon the highest Lands, in Huts fram'd of thin Boards (whereas in *Lapland* it self it is impossible to live so;) but they ought to sink their Houses under Ground, and to heap much Earth over them; since 'tis not possible, or, at least, extreamly difficult for Men to subsist in such an excessive Severity of *Winter*, unless they nest themselves under the Earth.

Observations in
two Voyages in the
East Indies; by
Mr Rich. Smith-
son. n. 50. p.
1003.

XXVIII. From *England* to *Cape Finis Terra*, in 44 Deg. N. Lat. The Bay of *Biscay* is subject to Storms, and the Sea rough, and the Waves running very high.

From thence to 34°. The *Wind* is variable; but if you be within 100 Leagues of the *European* Continent, it is generally enclin'd to North-East.

From 34 Deg. if you be inclining for the Coast of *Africa*, or about the Meridian of the *Canaries*, the *Wind* is so certain, and constantly at North-East (or within two Points) that it is rare to find it otherwise. Yet in *Winter*, upon the Coast of *Africa* there are sometimes westerly Storms, that are violent, but of no long Continuance: And in *Summer* when it is sometimes calm, the Air will come variably. These North-East Winds hold most commonly to 8°. North Lat. and then begin the Tornado Winds, which are most part confin'd between 8°. and 4°. North Latitude; they are seldom or never more Southerly, but on this side the Line they have sometimes been met between 11 and 12°. North Lat. These Tornadoes are uncertain Winds, blowing from all Points of the Compass in the same Hour, and sometimes the Wind shifts thus without being intermitted, and otherwhiles it will be stark calm, almost between every Puff. They are so confused, that let 4 or 5 Ships sail together as near as is fitting for Ships that keep Company, at the same Instant many times every Ship shall have a several and contrary Wind. And this Place is almost always infested with horrible Thunders, Lightnings and Rain. And the nearer you are to the *Africk* Shore, so much more dreadful is the Thunder and Rain; but the further Westward you go, the Thunder and Rain will be less, and the Wind not so uncertain; so that if you go as far West, as the Meridian of the East-side of *Brazil*, there is little Thunder, neither doth the Wind come down in such Puffs and Flaws; but between 4 and 8°. it is most inclin'd to Calms, and very great and thick Fogs, and the Rains come not in such violent Showers.

Likewise

Likewise this is a sure Rule, that near the *Africk-Shore*, and so for 100 or 200 Leagues West, the *North-East-Wind* commonly incline more and more to the *East*; so that by that time, you come to the *West* of the Meridian of the *Azores* but 20°, the *Trade* or constant Wind will be mostly *E. N. E.*

Now as from 34°. to 44°. near the Continent of *Europe*, the *Winds* are commonly between *E.* and *N.*; so after you come so far West as the Meridian of the hithermost of the *Azores*, they are commonly between *S.W.* and *N.W.* And for this reason, Ships that are Outward Bound on the *Strieghts*, keep near the Coast of *Portugal*, but Homeward Bound they many times forced to run far West to fetch a *Westerly Wind*. Likewise Ships Bound to the *Barbadoes* go by the *Canaries*, but came home, a great way to *North West* of the *Azores*. And the *Virginia* Ships are twice as long in going Out, as they are in coming Home, and many times Longer: For they come home before the Wind directly, but go Out round about as far as the *Tropick*, or at least 28°. Lat. for the benefit of the *North-East-Wind*; and when that hath carry'd them far West, they come back to the *Northward* again: and then as the *Westerly Wind* hangs more or less *Southerly*, they have a good or bad Passage.

Between 3 or 4° Northern Latitude, the *South-East-Wind* begins to take place between the *Æquator* and the *Tropick* of *Capricorn*: But the nearer you are to the Coast of *Africa* it is so much more *Southerly*; and as you approach the Coast of *Brasil*, it inclines more and more *Easterly*. And there is not only a *Variation* in the Wind in respect of *Longitude*, but also in respect of *Latitude*: For near the *Æquator* the Wind is more *Southerly*, than it is in the same Meridian near the *Tropick* of *Capricorn*. As for example, in the great Bay of *Guinea* (which our Seamen call the *Bight* of *Guinea*) the Wind (as I have been credibly informed) is mostly *South*; and inclines as much to the *West* as to the *East*: But in the same Meridian near the *Tropick* of *Capricorn*, I am sure it is constantly between *S. E. b. E.* and *S. E. b. S.* And on the contrary in that Meridian, which may be about 100 Leagues to the *Eastward* of *Brasil* near the *Æquator*, the Wind is between *South East* and *East South East*; and in the same Meridian the Winds near the *Tropick* are more variable, but most part about *North East*. In our latter Voyage from the *Line* to the *Tropick* of *Capricorn* we had many Calms, and what Winds we had were very small, which was in the latter half of *April* and the former half of *May*, but in our First Voyage in the latter half of *May* 1657. great Storms. The Stormy Days were in *May* 16, 17, 18. especially the 17 in 7 Deg. Southern Latitude. Also the 20 and 21 in the Lat. of 12°. and 13°: and the 27th at Night in Southern Lat. of 22°, which Storm was the most sudden and unexpected that ever I saw; for all Day it was very Fair Weather, and so till 8 at Night, and the Wind at *North East*, but on a sudden came a violent Storm of Wind at *South West*, and in a Moment the whole Heavens were become black and prodigiously dark, which continued till 4 the next Morning,

ing, with Intolerable Rain; and then the *Wind* came again at *North East*, and it was presently *Fair*.

Near *Africa* the *South East Winds* hold to 28° or 29° *Southern Lat.* but towards *Brasil* from the *Tropick* of *Capricorn* to 32° they are *Variable*, and to the *Southward* of 32° *Westerly*; as you may perceive by this following Account. May 29 *Lat.* $24^{\circ} 27'$. *Longit.* (by the *Plain Sea-chart*) from the *Lizard* 11° *West*; *Variation* $10^{\circ} 7'$ *East*: *Fair Weather*; the *Wind* from *S. W.* to *W.*

Jun. 1. little *Wind*, at *S. W.*

Jun. 2. *Lat.* $26^{\circ} 0'$ *Calm* all day, and a great *Storm* all Night at *South*.

3. Strong *Wind* at *S. S. E.* At 1 at Night it came to *E. b. S.* and Blew with the same *Violence* till next day Noon.

4. *Lat.* $26^{\circ} 15'$ *South Longit.* from the *Lizard* $9^{\circ} 24'$ *West*: the *Wind* moderate at *E. b. S.*

5. *Lat.* $27^{\circ} 32'$ a fresh Gale a *E. b. N.* dark and Cloudy but no *Rain*.

6, and 7 the same.

8. Dark day and *Calm* all Day and Night.

9. *Calm* till Midnight; then a little *Wind* at *N. W.*

10. *Lat.* 32° *Calm* all Day, and till Midnight; then a fresh Gale at *N. W.* This day we saw at great number of *Whales* sporting themselves.

11. *Lat.* $32^{\circ}, 43'$. The first clear Day we had in a Fortnight. Strong *Wind* at *N. W.*

12. *Lat.* $33^{\circ} 44'$. *Long.* 5° *West.* *Variation*, $9^{\circ} 40'$ *East.* Clear Weather, till the latter end of the Night; then it Rained: strong *Wind* at *W. N. W.* and a smooth Sea; so that we sailed this Day 177 Miles; the most that our Ship Sail'd in 24 Hours in all the time of the two Voyages, that I Sail'd in her.

13. *Lat.* $34^{\circ} 15'$ *South.* *Longit.* $20^{\circ} 7'$ *West.* Violent *Wind*. At 4 p. m. it shifted suddenly from *W. N. W.* to *W. b. S.* At 10 at Night to *S. W. b. W.* after midnight, to *S. W. b. S.* about 4 to *S. S. W.*

14. Very great *Wind* at *S. S. W.* About midnight it Shifted to *W.* and immediately followed a very Terrible *Storm* of *Wind* and *Rain*, and a great over grown Sea.

15. At 7. in the Morning the *Wind* came back again to *S. S. W.* the whole Day was a very Dreadful *Storm* of *Wind*. At Noon (by account) we were in $34^{\circ} 42'$ *South Lat.* and $30^{\circ} 20'$ to the *Eastward* of the *Meridian* of the *Lizard*. The Sea was exceedingly Rough. At 4 p. m. fell a great *Storm* of *Hail*. At night was a great *Eclipse* of the *Moon*; she began to be Totally Dark about half a quarter past 8, and began to recover some of her Light 2 Minutes before 9; as we reckoned the Time by our *Glas*s.

16. A little before Noon the *Wind* came to *West* and continued a strong Gale, but with *Fair Weather*.

17. *Lat.*

17 *Lat.* 35°. *South.* *Longit.* (from the *Lizard*) 7°. *East.* *Variation* 20°. 30'. *East.* We saw many great heaps of *Weed* in the Sea, and a great rolling Sea came out of the *South*. A strong *Wind* (without Gusts) all this 24 Hours at *W.*

18. A very strong *Wind* at *West.* We sailed 170 Miles.

21. Was the first clear Day we had this Month. *Latit.* 35°. 40' *South.* *Longit.* 17°. 40'. *Eastward*, from the *Lizard.* *Variations* 1°. 4'. *West.* The *Wind* at *North West* till 4 p. m; then it came to *West* with a thick Sky and cold *Rain.* At 8 to *W. S. W.* At 3 in the Morning to *S. W.* and at 6 to *S. S. W.* At 9 the next day to *South*: all strong *Winds.*

22. Dark and Cloudy. At 2 of the Clock the *Wind* came to *S. S. E.* At 4 to *E. S. E.* At 10 to *East*; and there continued till the 24th in the Morning; which all accounted very Strange.

24. In the Morning it fell *Calm*, and was pretty warm, having been bitter Cold the last 10 Days. At 3 a Clock in the Night a fresh Gale at *N. N. W.*

25. *Lat.* 36°. 10', *Long.* 21°. 25'. *Variation* 3°. 40', *West.* fair Weather. *Wind* *N. N. W.*

26. A clear Day *Wind* *N. N. W.* *Variation* 4°. 30'.

27. In the Morning *Calm*; about 9 *Wind* and *Rain* out of the *S. W.* At Night *Calm* and *Fair.*

28. A fair Day, and most part *Calm.* At 10 at Night, Heaving the *Lead* we had *Ground* 130 *Fathoms*; the *Sand* like *Calais Sand* The *Variation* was 7°. 10'. This was off *Cape Aguthas*, the most Southerly Land of all *Africa*, lying 90 Miles *E. S. E.* from the *Cape* of good Hope.

In our latter Voyage, after we came to 32°, *South Latitude* (to which Place from the *Line* we were much *Becalmed*) we had fair Weather, and a constant *Wind* between *W. N. W.* and *W. S. W.* all along to the *Cape*; (and so it is most commonly:) I have therefore noted the *Weather* in the former Voyage, because it was unusual; in the vast space between *Rio de la Plata* and the *Cape*, the *Wind* being all that Year *Westerly.* But about the *Cape* from the end or middle of *Sept.* to the beginning of *April* the *Winds* are *Variable* as in *England.* The rest of the Year they are *Westerly*, and *Intolerable Storms.*

I can give no Account of any thing to the *Southward* of 37 Degrees; those few Ships, that have adventured to 38°, reporting the *Winds* and *Seas* so raging, that no dare go further.

XXIX. 1. The greatest length of Time, that *Pearl divers*, in these parts, can hold under *Water*, is about a quarter of an Hour; and by no other means but custom. For *Pearl-diving* lasteth not above 6 Weeks, and the *Divers* stay a great while longer under *Water* at the end of the Season, than at the beginning. Here at *Batavia* is an expert *Diver*, who draws wages for nothing else but for *diving* for *Anchors*, *Guns*, &c. lost in the Road. I have seen him several times go down holding my *Breath* as long as I could, but he stayed 10 times as long under *Water* as I could hold my *Breath.*

But he will not go down unless you give him a whole Pint of Strong-water.

2. The Oyl drawn out of the *Roots* of *Cinamon* Trees, and resembling *Camphir*, is thence extracted, the *Roots* being dried, Bruis'd and steep'd in Water, and then drawn over by an *Alembec*.

3. The *Lignum Aloes* is part of a *Living Tree*, but commonly found when 'tis *Withered*. The Tree it self is of a white soft Wood, giving a *Milky Juice*, which is so *Venemous* withal, that if in cutting the Tree, any of the *Milk* light of your Eye, you grow *Blind*; if on any other part of the Body it becomes *Scabby*, and *Noyfomely Sore*. The *Lignum Aloes* or *Calambac*, is found within the white Wood, but not every where. When the Tree Decays, the white Wood, soon withers, and grows *Worm-eaten*; and the *Milk* so dries up, that you may easily rub it asunder with your hand. The best is found in the midst of the Tree, Nourished by the *Heart-Root*, which goes straight down into the Ground.

4. The Wood *sinking* like *Human Excrement*, grows thus naturally in the *Isles* of *Solor* and *Timor*, and thereabouts.

5. There are indeed such *Serpents* in these parts, which have an *Head* on each end of their Body, call'd *Cappa-Capella*. They are esteem'd *Sacred* by these People, and *Fortunate* to those in whose House and Lands they are found; but pernicious to whomsoever doth them Harm.

Observations in
the East Indies,
by
n. 243. p. 273.

XXX. It does not appear that the *Maldiva* Islands were ever join'd to the Main Land, there being no *Soundings*, as they call it, between the Island and the Main, and the Earth, Sand, and Shells, of the one, much differing from the other: The small Shells, call'd *Cowries*, which pass for *Money* in *Bengal* and other places, are chiefly found there.

The *North* and *South Poles* are not Visible under the *Line*: For in the clearest Night the *Horizon* is overcast with a thick mighty Darknes, that no *Star* can be seen.

Gum-Lack is the House of a large sort of *Ants*, which they make on the Boughs of Trees, which serves to keep them from the Weather, &c.

'Tis certain that *Cloves* will Attract Water at some distance; which is daily Experienc'd amongst the *Dutch* in this Country, who make a considerable advantage thereof. I have known a Bag of *Cloves* laid over Water one or two Foot distant, which has in a Night's time Imbibed a considerable Quantity of Water, and grown so moist that the Water might be press'd from them.

There has been an *Oyster shell* in *Bantam* that has been about 18 Inches Diameter, and several in *Maccao* that has been 18 Inches long, and 5 or 6 Broad, whose Meat within has been proportionable to the Shell.

I am well inform'd by the Persons that did see it, that at *Batavia* a whole *Duck* was taken out of the Belly of a *Snake*; and that in *Achia* they did kill a *Snake* that had a whole *Deer* in its Belly, which they took out being fresh and good, and that they did dress and eat part of the *Deer*.

They

They draw their *Wire* in Moulds of several Sizes, gradually as we do. The *Chinese* gild Paper with *Leaf-Gold* and *Silver*, laid on with a very good sort of *Varnish* they have, which is the same wherewith they *varnish* their *lacker'd Wares*; all which, after it is thoroughly dry, they put in a Screw-press, and with an Instrument like our *Plain*, shave it as fine as they please; and so they cut their *Tobacco*, which is as fine as a Hair.

Amber-Grease is found more or less in most Parts; great Quantities are found at *Japan*, and to the Eastward of *Java*, and at *Maldiva* Islands; which, they say, they find generally fasten'd to the Roots of Trees that grow in the Sea near the Shore; and that while it is kept under Water 'tis soft and pliable like Wax, and sometimes like Gelly: There is now a Piece in *India*, which I have seen, that weighs above 2000 Ounces.

The People of *Java*, marry, and have Children at 9 or 10 Years of Age; and generally leave Child Bearing at or before 30. At *Tunquin* there are Women common to any that will hire them, at 8 or 9 Years of Age.

The *Japan* and *China-Varnish* is made of *Turpentine* and a curious sort of Oyl they have, which they mix and boil to a convenient Consistence; which never causes any Swelling in the Hands or Face, &c. of those that make or work it. The Swelling that often happens to those that work the *lacker'd Ware*, and sometimes to those that pass only by the Shops and look on them at Work, is from the *Lack*, and not the *Varnish*; which *Lack* is the Sap or Juice of a Tree which runs out slowly by cutting the Tree, and is catch'd by Pots fasten'd to the Tree; 'tis of the Colour and Substance of Cream; the Top, that is expos'd to the Air, immediately turns Black, and the way that they make it Black and fit for Use, is to put a small Quantity into a Bowl, and stir it continually with a piece of smooth Iron for 24 or 30 Hours, which will both thicken it and make it Black; to which they put a Quantity of very fine Powder of any sort of burnt Boughs, and mix it very well together, and then with a Brush lay it smooth on any thing they design to lack; then let it dry very well in the Sun, which will then be harder than the Board it is laid on; when it is thoroughly dry you must rub it with a smooth Stone and Water till it is as smooth as Glass, and on that lay your *Varnish* made of *Turpentine* and Oyl, boil'd to a due Consistence, for black Lack; but if you would have Red, or any other colour'd Lack, you must mix your Colour in fine Powder with your *Varnish*, and take care to lay your *Varnish* on as smooth as possibly you can, for therein lies the Art of *Lacking* well. If you would paint in Gold or Silver, &c. you must with a fine Pencil dip'd in the said *Varnish*, draw what Flowers, Birds, &c. you please, and let it lie till it begins to be dry; then lay on your *Leaf-Gold* or *Silver*, or *Pin-Dust*, &c.

It is well known that there is amongst the *Bramines* a Language call'd the *Sanfcreet*, writ in a different Character from what is now in Use; in which Language are written the *Porane*, or sacred History; the *Shastram*, being to them what the Bible is to Christians; and the four Beads, (whereof one is lost) containing their Divinity, Law, Physick, &c. and some other Books. This Language is not understood by all *Bramines*, but only by

the studious and learned among them. I ask'd one of the most eminent among them in this Place, how long it was since the said Language was lost; who answer'd, that it was spoke in the Age of the Gods, or when they liv'd upon Earth; which by their Calculation continu'd many Thousand Years, and ended so many Years past, as we reckon from the *Flood*, or thereabouts; but they have little Knowledge in *Chronology*. It is evident that several of the Languages now spoke in *India*, are deriv'd from the *Sanscreeet*, and one of the *Bramines* wrote a Book to shew that the present *Hindostan*, or Language spoken by the *Moors*, in particular, is deriv'd from thence.

I have enquir'd of two of the most knowing *Bramines* in this Town, and they both agree, that our *Sunday* in every Week was a *Holy-Day*, or Day of Rest, with them, and for fear they should abuse me, I have ask'd a *Mawla*, or Mahometan Priest, a Native of *India*, and one that always liv'd amongst them, and he gave me the same Account. Besides this, they have their *Monthly Holy-Days*, for the 8th Day after the Change of the Moon is always a Day of Devotion, as also the 14th; and the 11th Day from the Change, a strict Fast, call'd *Jaka Dasee*, or *Taka Dasee*; so likewise the 8th Day from the Full-Moon, and the 14th are Days of Devotion, and the 11th a *Taka Dasee*. Besides these, they have throughout the Year several Festival Days and Times, as in other Religions.

Upon the Death of any Person, the next of Kin, especially a Husband for a Wife, a Father for a Child, & vice versa, as also a Brother for a Brother or Sister, deceas'd, do mourn 15 Days, during which time they eat only Rice and Water, and are not either to eat Betle, or mark their Foreheads, but use several Washings, and variety of other Ceremonies; as carrying Victuals to Gardens, Groves, and Tanques; to distribute, and make several Prayers that God would grant the deceas'd Party a good Place in the other World, forgive him his Sins, be favourable unto him, &c. and upon the 16th Day they make a Feast to all their Friends and Relations and those of their own Coast, as they are able, and likewise Tearly upon the Day of his Death they give *Alms*, i.e. Victuals to more or less poor People, as they are able, with whom they make Prayers for the Dead.

Observations in
Japan; by M.
... 49
p. 23

XXXI. 1. The *Japonefe* doubt not at all of their Country's being an *Island*, though it be separated from the *Continent* by such narrow Channels, that no Vessel of any considerable Burthen can pass them.

2. The *Air* is very *Salubrious*; but of another Temper on this, than on that side of the *Mountains*, which divide *Japan*. The *Plague* hath never been heard of there; but the *Small Pox* and *Fluxes* are very frequent.

3. Their *Mountains* are fertile almost to the very Top.

4. There are found almost all *European* sorts of Fruit: *Peaches*, *Apricocks*, *Cherries*, *Prunes*, *Apples*, *Pears*; and particularly *Pippins*, *Bon Cretien-Pears*. Besides these there is an Infinity of other Fruit; but almost none, but what is found in some part or other of *India*.

5. *Silver*

5. *Silver* is there in its highest Perfection, but not used in Trade; in which is seen nothing but *Gold*, and some small Coin of *Brass*; which latter they spoil by refining it too much. *Steel* also is there very good.

6. The Temper of their Metals was formerly better than 'tis now; but yet they make *Courtels*'s, or short Swords, exceeding good.

7. The great *Mountain* of *Japan* is higher than the *Pico* in *Teneriff*, since being above 18 *Leagues* distant from the Sea-side, it may be seen above 40 *Leagues* off at Sea. There are 8 *Vulcanos*, or *Fire-Spitting Mountains*, in *Japan*; and you cannot go into the *Campagne*, but you discover one or other of them.

8. There are many *Medicinal Waters*, and *hot Springs*, which the Inhabitants use in their Distempers. They have particular Medicines; but they let no *Blood*. They make much Use of *Canslicks*, by applying upon some *Nerve* or other the Powder of *Artemisia*, or *Mugwort*, and *Cotton*, which they set on Fire. They always drink their *Liquors* warm.

9. There is so great a store of *Venison* in *Japan*, that they care little for Cattle; tho' there be not Want of them. They employ most *Oxen* for ploughing; and they make no Butter nor Cheese; nor are they Lovers of Milk. They have great Plenty of *Corn* and *Rice*.

10. The *Japonesse* are proper enough of *Stature*, and not uncomely in *Features*; they have somewhat prominent Bellies; they are exceeding Active, and want no Judgment; they are also Military and Valiant.

11. No *Arts* are to be met with amongst them, that are not known in *Europe*, except that of making *Lacca*; of which there is some so fine and curious, that whereas in this Country one may buy an ordinary small Box for 3 or 4 *Crowns*, one of the same size, when made in *Japan* of exquisite *Lacca*, will sell for more than 80 *Crowns*. The Author of this Account hath 4 *Cabinets* of this Workmanship, which he affirms to have cost him above 40000 *Crowns*, which he will not sell under 80000 *Crowns*.

12. The *Colours*, with which they dye their Stuffs, never fade: I have seen one of them, which our *Vermilion* and *Couleur de feu* come not near to. It is extracted out of a Flower, like to *Saffron*, and one Pound of it costs an incredible Price. To try whether the Colour will not change by *Lixivium*, or *Lye*, they apply an hot Iron to it; and if there it holds, they assure themselves of the Durableness of the Colour.

13. They have *Mathematicians* amongst them, and believe *Judiciary Astrology*, insomuch that the *Grandeas* undertake nothing without preconsulting those that make Profession of the same.

14. *Japan* yields divers Sorts of good merchantable Commodities; but chiefly all sorts of *silken Stuffs*, *unwrought Silk*, *Amber*, *precious Stones*, *Musk*, *Copper*, *Steel*, *Lack-work*.

15. The Country is very well peopled and exceeding Rich; but exceedingly stored with *Gold-Mines*; and I have seen some of the *gold Ore*, which of 10 *Onnces* yields 8 of the highest *Fineness*, and pieces of the Weight of 120 *Marks*.

16. Their

16. Their *Buildings* are very good and commodious. The *Apparments* are all below on the Ground, separated from one another by *Partitions* of *Carton* painted and gault, which may be folded and removed like *Skreens*. Their *Floors* are covered with *Matts*, and sometimes with *filken Stuff*, embroidered *Velvet*, and *Cloth of Gold*.

17. They have no other *Conveniencies* to defend themselves from *Heat* and *Cold*, but such as are usual in *Italy* and *Spain*.

18. They use the *Divertisements* of *Comedies*, which are more brave than those of *Europe*. The *Spectators* are about 200 *Paces* distant from the *Theater*, which being covered with a *Vault*, makes the *Voice* of the *Actors* to be understood to the very end of the *Theater*. They love *Hunting*, and *Gaming*, as *Dice*, *Cards*, *Chefs*, &c. At all times of the *Day*, and in all their *Visits* they take *Tea* and *Tobacco*.

19. Their *Language* is altogether different from the *Chinese*; but their *Priests* and *Courtisans*, that is, the *Learned* amongst them, which bear the *Offices* of the *Court*, understand the *Tongue* of *Cochin China*, and by this means that of *Tunquin*, *China*, *Corea*, &c. They write neither from the *Right* to the *Left*, nor from the *Left* to the *Right*, but *downward*.

20. Their *Government* is *Despotique*; the *Religion*, *Pagan*; the *Christi-an* hated upon no other *Account*, but that some of those, that there professed it, would persuade the *Japonefe* to acknowledge a *Superiority* above the *Dignity Royal*, disposing of *Crowns* and *Scepters*. Their *Morals* are very good, their *Faults* being punish'd as their *Crimes*; even *Lying* and *Detraction*. Their *left Hand* is the more honourable, and they take *Horse* on that side.

Observations in
Hollandia Nova,
by M. Witfer,
n. 245. p. 361.

XXXII. In a large *Voyage* to the *South-Land*, call'd *Hollandia Nova*, it hath been discover'd that the *Soil* of the *Country* is very barren and as a *Desart*; no *Fresh-Water Rivers* have been found, but some *Salt-Water Rivers*; as also no *four footed Beasts*, except one as great as a *Dog*, with long *Ears*, living in the *Water* as well as on the *Land*.

Black-Swans, *Parrots*, and many *Sea-Cows* were found there, as also a *Lake*, whose *Water* seem'd to be *red*, because of the *Redness* of the *Bottom* of it; and round along the *Shore* there was some *Salt*. Our *People* saw but 12 of the *Natives*, all as *Black* as *Pitch*, and stark *Naked*; so terrify'd that it was impossible to bring them to *Conversation*, or a *Meeting*. They lodge themselves, as the *Hottentots*, in *Pavillions* of small *Branches* of *Trees*. By *Night* our *People* saw *Fires* all over the *Country*; but when they drew near, the *Natives* were fled. The *Coast* is very low, but the *Country* far from the *Sea* is high.

Upon the *Island* near the *Coast*, were seen *Rats* as great as *Cats*, in an innumerable *Quantity*; all which had a kind of a *Bag* or *Purse* hanging from the *Throat* upon the *Breast* downwards. There were found many *Well-Smelling Trees*, and out of their *Wood* is to be drawn *Oyl* smelling as a *Rose*; but for the rest they are small and miserable *Trees*. There were also found some *Birds-Nests* of a prodigious *Greatness*; so that 6 *Men* could

could not, by stretching out their Arms, encompass one of them: But the *Fowls* were not to be found.

There was great store of *Oysters*, *Lobsters*, and *Crabs*; as also of strange sorts of *Fish*.

There were also Millions of *Flies* very much troubling Men. They saw a great many Footsteeps of Men and Children, but all of an *Ordinary Bigness*. The Coast is very Foul and full of Rocks.

XXXIII. In *Brazil*, there are certain little Animals, call'd *Poux de Pharaon*, which enter into the Feet betwixt the Skin and the Flesh; they grow in one Day as big as *Beans*, and if they are not presently drawn out, they make an Unsupportable Ulcer, and all the Foot corrupts.

In the Kingdom of *Congo*, there are Serpents 25 Foot long, which will Swallow at once a whole *Sheep*. The manner of taking them is thus: When they lie to digest what they have eaten, they stretch themselves forth in the Sun: which the *Blacks* seeing kill them: And having cut off their Head and Tail, and Embowel'd them they eat them, and ordinarily find them as fat as Hogs.

There are here a great Number of *Ants*, and of that bigness that the Author, being one Day sick in his Bed, was forced to order himself to be carried out of his Room, for fear of being devoured by them: As it often happens to those of *Angola*; where you may also find in the Morning, the Skeletons of *Cows* devoured by these *Ants* in one Night.

Amongst other fair *Fruit Trees* in *Brazil*, there is one, whose Fruit is call'd *Niceffo*: which hath this remarkable, that it hath but *Two Leaves*; whereof each is able to cover a Man.

XXXIV. *Oct.* 3. 1687. The King of *Feton*, *Aben Penin Asbrive*, dy'd here at *Cape Corse*; where he had been long Sick. The *Fetishers* had done all they could to save his Life, which was nothing at all to Purpose; their *Physick* scarce extends to any thing but the *Flux*, and what we call the *French Disease*; his was a *Consumption* and an *Asthma*, of a great Continuance. So they fled to the Aid of their *Religion*, and according (it seems) to the Rules of that, they made several *Pellets* of *Clay*, which they set in his Room, in rank and file, all *Sprinkled* with *Blood*; besides the several *Muttons* which they eat to his good Health. But that was of too little Force; so the Man dy'd, having deliver'd his Sword to the *Dey*, who in the *Interregnum* was to be the Principal Man; for the Kingdom is *Elective*: and Commanded him to be constant to the *English*, of whom himself had been a great Favourer, with a Threat, if he was not, of haunting him after his Death: He also appointed one of his *Wives* whom he thought worthy of that Unlucky Honour, to accompany him to the other World. The next Day he was carry'd to *Feton*, and Bury'd there, *Nov.* 2. with the poor Woman we spoke of. Presently after, they that were considerable, or had a mind to seem so, sent in them that they had a mind to murder, in Honour of the King: How many there were 'tis hard to say, the highest Account

Observations in Brazil and in Congo, by Mich. Angelo de Guarini and Dionysius of Placenza. n. 139. p. 797.

Observations at Cape Corse, by Mr. J. Hillier. n. 232, p. 687.

Account gives 90, the lowest, 50, the middle 70: The *Blacks* do not understand *Arithmetick*, so the numbers they give in all Cases are very uncertain. I think there were about 8 from this Town, which will not hold Proportion to the highest rate; but 'tis like near *Feton* there might be more. They say also, that many more will follow at *half a Tear's* distance from his Death. The manner of the Execution of these poor Creatures, I have not yet learnt; only that they make them drink and dance, with a great deal of Bravery all the beginning of the Day, and towards Night cut off their Heads: but whether by that they mean the common way of their *Executions*, I am yet to seek.

After the *King's Funeral*, the next thing was to chuse a *Successor*; so the People were call'd together at *Feton* (I suppose by the Authority of the *Dey*) without enquiring any thing of their *Freehold*; they pitch'd upon Mr. *Dey*, though he were not of the *Blood-Royal*; the reason was, as they said, because he had *Power* enough to do what he pleased, and they could do nothing against him; but he refus'd the Honour because of the Charge 'twou'd put him to, and propos'd the *Brother* of the *Deceas'd King*: So the Business stuck sometime, but at last 'twas accorded, and King *Askrive's Brother* declar'd King, Nov. 18. his Name is *Ahenaso*.

The manner of their ordinary *Executions* is thus: The Creature that is Condemn'd, is made to drink abundance of *Palm Wine*, and to dance, every body that will, in the mean time striking or pushing him: when that is over as is said, he is thrown down, his Face into the Sand, which whether it stifle him or not, I can't tell, then his *Legs* are cut off below the *Knees*, and his *Arms* below the *Elbow*; afterwards his *Thighs*, and his *Arms* below the *Shoulder*; lastly his *Head*.

When any one has new *Drums* or *Trumpets*, 'tis necessary that they be Consecrated with *Human Blood*: I have known but one happen of this kind, which was Jan. 7. 1687. when after a Man had been *Executed* after the former Rate, about 8 in the Morning, at one in the Afternoon, they drank *Palm Wine* out of the upper part of his *Skull*, and this in the Sight of all the *Factors* at *Cape Corse*.

The *Shore* lies almost *East* and *West*, expos'd to the Sea wholly upon the *South*; the Country is *Hilly*, the Hills are not very high, but thick, clustering together, the Vallies between extream Narrow; the whole in a manner cover'd with certain *Shrubs*, low but very Thick; what the People *Till*, comes not to above a tenth part of their Ground; and where they do *Till*, it hinders not that within *half a Tear* the Ground is overgrown as before, for they do not Root up the *Shrubs*, but only cut, and sometimes burn them somewhat close to the Earth, so they spring again in a very little time; this is sufficient for planting their Corn, which they do by making little Holes in the Earth at a competent distance, and putting Seeds into them.

It may be that if those *Shrubs* were destroy'd, the *Unhealthiness* of the Place might be mended: which yet is not to be hop'd for, but by bringing the People to some kind of *Industry*; and that will not be easy, they are so

so wholly given to Laziness and so entirely bred up in it, that there must be the greatest change Imaginable, before they become any whit tolerable. A Man may see their Temper by this, that though their *Tillage* be very easy, and the Earth yields many hundreds for one, yet so little is the use they make of it, that one scarce Year brings them to danger of Starving; and though there be People enough, and every Man has power of choosing what he will, that is not already *Till'd* by some other, yet not the *tenth* part, as we have said, is employ'd; so that a Man would wonder what came in the *French Man's* Head to fancy them Industrious. But *Subtile* they are, and diligent to cheat any Man that is not Cautious enough to avoid it.

So that the *fault* of the *Wood* is (by the Laziness of the People) without any Remedy. But there may be something in the *Earth* it self; the Water which they have here in *Pits* (Rain-water for the most part, but yet strain'd through the *Earth*) has a kind of taste mixt of *Sweet* and *Subacid*, if I understand what I say, I am told 'tis of *Vitriol*, whether that be mischievous, you know better than I do; but I take this for certain, since I have had it from good Hands, that at *Whiddah*, which is one of the most *Unhealthy Places* in *Guiney*, but 'tis not upon the *Gold-Coast*, he that opens the *Ground*, though it be but to dig a Grave, runs the hazard of his Life; so Mischievous are the *Steams* from thence arising. It's possible there may be some such *Steams* here, only not so Violent; though in *England*, I think a *Gravel* or a *Sand* (which here are always uppermost for as much as I have seen, are esteem'd very wholesome *Soils*; under them is a kind of *whitish Marle* almost like *Fuller's Earth*).

The *Age* of the *Inhabitants* is very uncertain, because none of them keep an Account of it; there are some of them very *Grey*: but if the Country be to them *Unhealthy*, *Grey-Hairs* may come early. I think there be many more *Funerals* here than at *Oxford*, though that be a much larger Place, especially in the *Rain* times, which to us are always *Healthful*.

I think that much of the *Mortality* (not all) that happens among *Strangers*, is the Effect of their ill Diet and ill Government of themselves: For they eat but little, having neither Somach nor Money to buy what they want; but they drink Excessively, being for that more readily trusted, and of Liquors very hot and Spirituous; and if any chuse the *Cold* rather, his Stomach is chill'd, and he is in danger of a *Flux*, or an *Extream Looseness*, and that immediately.

There is another thing; Men guard themselves less from the *Air* than in any other Place, trusting to the *Heat* of the *Climate*, and receive the *Cool* of the Evening with only a shirt. Now I think that the *Air*, though not so *Cold*, is much more *Subtile* and *Piercing* here, than in *England*: It corrodes Iron much more; not by the *Moisture*, for it is not so *Moist*, and besides it does it in the *dry Weather* too. The last Year, from *Nov.* 1686, to *Nov.* 1687, has had the most *Rain* of any that can be here remembred; yet the *Mortality* was much less than the Years before; so that perhaps wet is not that which makes the Country *Unhealthy*; though

*Vid. sup. Vol. I.
Chap. I.*

we had very many *Sick*, especially in *June* and *July*, whose diseases were not *Mortal*.

*Observations
in West Barbary,
from Cape Spar-
tel to Cape de
Gee: by Mr.
Jezreel Jones.
n. 254. p. 248.*

XXXV. The *Mauritanian* or *Barbarian Moor*, when he rises in the Morning, washes himself all over, and dresses, than goes to their *Jiams*, or Church, says his *Prayers*, and returns home, where his Wife, Concubine, or Slave, hath his Breakfast provided for him; which is sometimes made of *Barley* or *Wheat-Gruel*, for I have known both. It is made something thicker than ours, till it be ropy; they put *Origan*, and other Herbs, powder'd into it, which for such Uses they keep dryed all the Year; some will put a little *Pepper* and other *Spice*. I have often been treated with warm *Bread*, fresh *Butter*, and *Honey*, in a Morning, which is not seldom used amongst themselves, an Hour or two after they have had *Gruel*; as also *Hasty-Pudding*, with *Butter*, and sometimes *Butter and Honey*. Some again give *Cuscusoo*, with *Milk*; others with *Flesh*, a third with *Roots*. When any one hath a Guest or Guests in his House, the Neighbours bring their Dish to welcome him or them, on account of the Respect and Love they bear to their Neighbour, as well as to shew their readiness to entertain the *Stranger*. This Practice is found constantly used throughout the whole Country amongst the *Moors* one towards another, reciprocally: And I have as often found the like Civility, as I had occasion to take up my Lodging at any Place, where I was acquainted with any of the Inhabitants. The *Jews* likewise shew great Civility to any *Christian*, and treat him with what they have, as *Stew'd* or *Baked Hens*, *Capons*, *hard Eggs* boiled or roasted, (which they press flat with *Pepper* and *Salt*) *Wine*, *Brandy*, &c. They have generally the best *Bread*, and every thing else of the kind that they can get. They put *Annis*, and 2 or 3 other sorts of *Seeds* in their *Bread*; one is Black and Angled, tastes almost like *Carrot-Seeds*, and I think I have seen these sometimes used in *Bread* in *Spain*. They esteem *Honey* as a wholesome *Breakfast*, and the most Delicious that which is in the *Comb*, with the young *Bees* in it before they come out of their *Cases*, whilst they still look Milk-white, and resemble (being taken out) *Gentles*, such as *Fishers* use: These I have often eat of, but they seemed Insipid to my Palate, and sometimes I have found they gave me the *Heart-Burn*.

In *Suse* I had a bag of *Honey* brought by a Friend who made a present of it, as being of great esteem; this he told me, I was to eat a little of, every Morning, to the Quantity of a Walnut; it was thick as *Venice Treacle*, and full of small *Seeds*. It always made me *Sleepy*, but I found my self well, and in very good temper of Body after it. The *Seeds* were about the bigness of *Mustard*: And according to the Description of them to me, and the Effects I found by eating the *Honey* and them, they must be a large sort of *Poppy Seed*. The *Honey* was that sort they call in *Suse*, *Izucanee* or *Origanum*, which (the *Bees* feed on, and) these *Seeds* were mixed with.

Cuscus or *Cusksoo*, is the principal Dish amongst them, as the *Olla* is in *Spain*. This is made of *Flower of Wheat*, and when that is scarce, of *Barley*, *Millet*, *Indian Corn*, &c. they shake some *Flower* into an Earthen Pan, made on purpose,

purpose, which is not glazed, sprinkling a little Water on the bottom of the Pan first, then working it with both their open Hands flat, turning them backwards and forwards to grain it, till they make it much resembling *Sigo* which comes from the *East-Indies*. They *strew* their *Flesh*, keeping their Pots close covered which are made of Earth, put the *Cuskfoo* into an Earthen Cullender, which they call *Caskafs*, and this Cullender into the Mouth of the Pot, that so all the *Steam* which rises from the Meat may be imbibed by the *Cuskfoo* which causes it to swell, and makes it fit to be eaten. When it is enough they put this *Cuskfoo* out into a Dish, and the *Cuskfoo* being heaped up, they make (as it were) a Bed or Place for the Meat to lie in, then they put good store of *Spice*, as *Ginger*, *Pepper*, *Saffron*, &c. This *Dish* is set upon a *Mat* on the Ground, and 4 Men may easily sit about it; tho' I have seen 6 or more at one Dish, they sit with their Buttocks upon the Calves of their Legs, with the bottom of their Feet on the Ground. If there are many to eat of this Meal, there are more *Dishes*. This *Dish* they have in Use sometimes at *Breakfast*, as well as *Dinner* and *Supper*, but it is commonly used for the two last Meals.

At a stately Entertainment they will have a Sheep roasted whole, sometimes a Half, or a Quarter on a *wooden Spit*, or the most convenient thing they can find. They do not continually keep turning it, as we do, but leisurely let one Side be almost roasted before they turn the other. The Fire is commonly of *Wood* burnt to clear Coal, and made so that the Heat ascends to the Meat. They baste it with *Oyl*, and a little *Salt* and *Water* incorporated. They let it be thoroughly roasted; then they say, *Bismiillah*, *In the Name of God*, after they have washed their right Hands, and pulling the Meat in Pieces, they fall to eating. It is to be noted, that they never use but their right Hand in eating, and one holds while the other pulls it asunder, distributing the Pieces to the rest, as he pulls it off. They seldom use a *Knife*, and a *Fork* is a strange thing amongst them. They are dextrous at this way of *Carving*, and never flinch at the Heat or Warmth, for that would look mean, and might occasion one more Bold to take his Office upon him to perform. When they have done, they lick their Fingers, and as often as they have a hot Dish, they wash their Hands afresh. Then they have *Alfdoush*, or *Virmezzelli*, with some Meat on it, stewed Meat, well spiced with savory Broth; and after they have eat the Meat, they dip their Bread in the Sauce, or Broth, and eat it. They are cleanly in their Cookery; and if a Hair be found it is a capital Crime, but a Fly not, because it has Wings, and may get in after it passes from the Cook's Charge or Management.

Cubbob is small pieces of Mutton with the Cawl of a Sheep wrapped on them. Some make good *Cubbob* of the Liver, Lights and Heart. They *Pepper* and *Salt* them, and put *sweet Herbs* and *Saffron* into them, then roast them, and when they dish them up, squeeze an Orange or two on them.

Elmorofia is another: This is Pieces of Beef, of Cow or Camel, stewed with *Butter*, *Honey*, and *Water*; some will put *Rob* of *Wine* amongst it;

they add Saffron, Garlick, or Onions, a little Salt, and when it is enough serve it up. They esteem this a delicious Dish, used mostly in the Winter, and say, it is good against Colds, notwithstanding they say Beef is cooler than Mutton. Then they will treat you with Hare stew'd, stew'd and roasted Hens and Partridges: These they disjoynt, and let stew in Water and Oyl, or Butter, if they are not Fat enough of themselves. When they are almost enough, they beat a Couple of Eggs, mix them with the Liquor, with Juice of Lemon, or Vinegar, which they usually have very good, and serve it up.

Then you may have more Baked and Roast, and another Dish of stew'd Meat, which for its Goodness would be esteem'd amongst us: They take a Leg of Mutton, cut off the fleshy part, leave out the Skin and the Sinews. This Flesh they mince very fine, they also mince some Suet, Parsly, Thyme, Mint, &c. Then they take Pepper, Salt, and Saffron beaten together, and some Nutmeg, and these they add to the rest, with about half a Handful of Rice; they cut an Onion, of the best sort, half through, and take off the first Lay, as not so fit for Use, unless it be thick. (They that are curious take out the inner Skin, saying, it is not wholesome, and bad for the Eyes, it being the worst thing in an Onion, which otherwise would be the best of Roots:) This Lay they fill with forc'd Meat, then the next, and so on, which makes them look like so many Onions; some they put up in Vine-Leaves, of the best they can find for their Purpose. Whilst this is doing, the Bones and Residue of the Leg of Mutton, being in moderate pieces, are stewing, with as much Water as will just cover them; then they put on their forced Meat Balls a-top of the Meat, and a green Bunch of Grapes upon them, cover it, and let it boil till thoroughly enough. This, I think, is one of their best Dishes, which they often use in *Fests* and other Cities.

Pillowe, or *Piloe*, is a Dish very well known, made with Rice boil'd, with a good Hen, Mutton, and Spice, the Flesh and Fowl being put on the Rice in a Dish, as *Cuskoo*, and so served up.

A *Bustard*, which they roast and stew, and make an excellent Dish of its Guts, (I eat of it once) to me seem'd very pleasant and savory, and very grateful to the Stomach. This Bird is fit for their King's Table, as likewise the *Hedge-Hog*. Then they have *Ragous*, made with *Sparrows*, *Pidgeons*, &c.

Their *Drink* is plain Water or Milk, and sometimes *Rob* of *Wine* mix'd with Water. I was once treated with this by the *Bashaw* of *Suse*, *Abdomeleck ben Alchotib*, and there was brought to me a great Bowl which held above 3 *Quarts*; he told me, there was not above half a Pint of this *Rob* in it, and the rest was fill'd with Water. It was very generous and pleasant, and tho' I did not drink a Quarter of it, yet I found the Strength in half an Hour. This they say is a Remedy against Cold likewise, and pretend to take it Medicinally; tho' *Rob* of *Grapes* is lawful, according to their Law. Under this Pretext, many *Fessie* Merchants, to make *Rob* or *Vinegar*, press all the *Grapes* in their Vineyards, put it up in Jars under Ground, and keep

keep it long; so that it proves excellent *Wine*. When 4 or 5 merry Companions, with every one his Mistress, appoint to be merry, they go out to their Vineyard or Garden, have Musick, and all or most of those Dishes, and there sit and carouse over a great earthen Bowl full of *Wine*, of about 4 or 5 Gallons, and so drink round in a Cup that will hold almost a Pint, like a large *Tea-Dish*, till there is none left; it often happens that they do not part till they have made an end of the whole Jar, which seldom is less than a *Week's Time*; I have known some that have been 9 Days successively drunk. Those that are known to drink *Wine*, or piss Standing, their *Testimony* will not be valid in Law. In a Morning during the Time of Merriment, they are for some savoury Bit, pickled Fish, or *Escaveche*, or *Elcholle*. They are great Lovers of Fish; and have a great Variety, and very good, which they fry in *Origan Oyl*, stew, roast, and bake, with good store of Spice, Onions, Garlick, Cummin, Parsly, and Coriander. The *Escaveche*, or fry'd Fish, is cut in thin Slices, and put into Vinegar, with the aforesaid Spices, adding Saffron and Pepper, &c. It will keep above a Month, and this they have commonly, as also pickled Limes, Olives, Capers, &c. They eat parch'd *Garavanças*, parched Almonds, and Beans, which they parch in a Pan with Water and Salt. These, and other Things, they have to relish their Glass of *Wine*, or give them a fresh Appetite to drink.

The *Hedge-Hog* is a princely Dish amongst them; and before they kill him, rub his Back against the Ground, by holding his Feet betwixt two, as Men do a Saw that saw Stones, till it has done squeaking; then they cut its Throat, and with a Knife cut off all its Spines and singe it. They take out its Guts, stuff the Body with some Rice, sweet Herbs, *Garavanças*, Spice and Onions, they put some Butter and *Garavanças* into the Water they stew it in, and let it stew in a little Pot, close stopped, till it be enough, and it proves an excellent Dish. The *Moors* do not care to kill Lamb, Veal nor Kid, saying it's a Pity to part the Suckling from its Dam.

They eat with their boil'd Meat, many times, Carrots, Turnips of two or three sorts, Cabbage, Beans and Pease, &c. of which they have Plenty, and very Good. I have eat of *Porcupine* stew'd, which much resembled *Camel's Flesh* in Taste, and that is the nearest to Beef of any thing I know.

I come now to give an Account of the *Alchollea*: It is made of Beef, Mutton, or *Camel's Flesh*, but chiefly Beef, which they cut all in long Slices, salt it well, and let it lie 24 Hours in the Pickle. Then they remove it out of those Tubs, or Jars, into others with Water, and when it has lain a Night, they take it out, and put it on Ropes in the Sun and Air to dry; when it is thoroughly dry'd and hard, they cut it into Pieces of 2 or 3 Inches long, and throw it into a Pan, or Cauldron, which is ready with boiling Oyl and Suet, sufficient to hold it, where it boils till it be very Clear and Red, if one cuts it; which taken out, they set to drain: When all is thus done, it stands till cool, and Jars are prepar'd to put it up in, pouring the Liquor they fry'd it in upon it, as soon it is thoroughly

roughly Cold, they stop it up close. It will keep two Years, it will be hard, and the Hardest they look on to be best done. This they dish up Cold; sometimes fryed with Eggs and Garlick; sometimes stew'd, and Lemons squeez'd on it. It is very good any way, either Hot or Cold.

Before I conclude, I willingly give an Account of their *Travelling Provision*, viz. Bread, Almonds, Raisins, Figs, hard Eggs, cold Fowl, &c. But what is most used by Travellers, is *Zumeet*, *Tumeet*, or Flower of parched Barley for *Limereece*. These are not *Arabian* but *Schica* Names, so I believe it is of a longer standing than the *Mahometans* in that part of *Africk*. They are all Three made of parch'd Barley-Flower, which they carry in a leather Satchel. *Zumeet* is the Flower mix'd with Honey, Butter, and Spice; *Tumeet* is the same Flower done up with *Origan Oyl*; and *Limereece* is only mixt with *Water* and so drunk. This quenches Thirst much better than *Water* alone, satisfies a hungry Appetite, cools and refreshes tir'd and weary'd Spirits, overcoming those ill Effects a hot Sun and a fatiguing Journey might occasion. This amongst the *Moutaineers* of *Suse*, is used for their Diet as well at Home, as on their Journey.

All things taken in Game, as *Hawking*, *Hunting*, and *Fowling*, are lawful for them to eat, if they take it before it be dead, so that they can have time to cut its Throat, and say, *Bismiillabe*; or if he is known to be an expert Man at the Game, and says these Words before he lets the *Hawk* take its Flight, let's slip the *Grey-Hound*, or fires his Gun, it is lawful; all (I say but *Swine's Flesh*, and what dies of its self) they have Liberty to eat, and may sell it. They tell us, there is but one part about the *Hog* or *Swine* that is unlawful; which they do not know, and are oblig'd to abstain from the whole; but if they knew it, they would let us have but little to our Share. They eat *Snails* boil'd with Salt, and praise their Wholsomness. *Fish* of all sorts are lawful. In *Tafflet* and *Dra* most of their Food is *Dates*; there are ten or a dozen Sorts.

They have good *Capons* all the Country over; no *Turkeys*, *Ducks*, nor *Geese*, but *wild*, and those they have of two sorts; *Ducks*, *Teil* and *Mallard*, *Corlews*, *Plovers*, *Snipes*, *Oxbirds*, *Pipers*, a sort of black Crow with a bald Pate, and long crooked Bill, is good Meat; and a hundred other sort of Fowl. I have eat *Antelope*, which we have kill'd in *Hunting*, and are very good Food. They are as large as a Goat, of a *Chestnut* Colour and White under the Belly; their Horns are almost quite straight from their Head up, tapering gradually, with Rings at a distance from one another, till within an *Inch* and a half of the Top; fine large black Eyes, long and slender Neck, Feet, Legs and Body, shap'd somewhat like a *Deer*, they have two Cavities between their Legs, I think the Male as well as the Female. There are many in a *Herd*, when at the same time they have *Scouts*, or those, who by running give them Notice of an approaching Foe. When two lie down together, they lay themselves so, that their Backs are towards each other, and the Head of one towards the Tail of the other, that they may see every way. Their *Dung* is sweet and pleasant enough. They are taken sometimes by the *Hawk*, sometimes by the *Shot*; for they are too swift for a *Greyhound*.
Partridges

Partridges in *Sus* commonly Roost on *Trees*, there are so many *Foxes* which would otherwise destroy them.

The *Moors* will eat *Fox*, if it be fat, either stewed or roasted, but they do not care for it lean, which has occasioned a Proverb amongst them on that account, to wit, *Hellel deeb, Horam deeb*; alluding to the Scruple might be made of its *Lawfulness*, these Words signify, a *Fox is Lawful*, and a *Fox is Unlawful*; i. e. Fat, *Lawful*; Lean, *Unlawful*.

Fruits and *Sweet-Meats* they have of many kinds, as of 3 or 4 sorts of *Pumkins*, *Macaroons*, *Almonds* prepar'd many ways, *Raisins*, *Dates*, *Figs* dry and green, excellent *Melons* of 2 or 3 sorts, and *Water-Melons*, *Pomegranates* of several kinds, *Apples*, *Pears*, *Apricocks*, *Peaches*, *Mulberries* white and black, *Plums* and *Damascus-Cherries*, *Grapes* of many kinds, and very good, I have known *Grapes* in *Messia* (Lat. 30°, or thereabouts) as big as a *Pidgeon's Egg*, (but they do not make *Wine*;) and if they would assist Nature, they might have every thing in Perfection.

Their *Salating* is *Lettuce*, *Endive*, *Carduus*, *Parsley*, *Apium*, and other *Sweet-Herbs*, *Onions*, *Cucumbers* of several kinds, some about a *Tard* in length, and 2 or 3 *Inches* thick, and *Hairy*, (this is esteem'd the wholesomest) *Radishes*, *Fumatas*, or *Apples of Love*, all which they cut, and put Oyl, and *Vinegar*, and *Salt*, with some red-*Pepper*; This *Salate* they eat with *Bread*.

They have a *Fruit* call'd *Baranêen*, in *Spain* *Baragenas*; these they stew with their *Victuals*, and sometimes cut them in thin slices, and Fry them; it makes a pretty Dish.

When the *Moors* have Feasted, every one washes his *Hands* and *Mouth*, Thanks God, and Blesses the *Hosts* and *Entertainers* from whom they had it; they talk a little and tell some *Story*, and then lie down to Rest.

XXXVI. Papers of less General Use, Omitted.

1. General Heads, for a *Natural History* of a Country, great or small; by Mr. Rob. Boyle. n. 11. p. 286.
2. Directions for Observations and Experiments to be made by Masters of Ships, Pilots, and other fit Persons, in their *Sea Voyages*; by Mr. Rook: enlarg'd by Sir Rob. Murray, and Dr. Rob. Hook - - - n. 8. p. 140.
n. 24. p. 431.
3. Enquiries and Directions for the *Ant Isles*, or *Caribbee Islands*; by - - - n. 33. p. 634.
4. Enquiries for *Virginia* and the *Bermudas*; by - - - n. 23. p. 420.
5. A Catalogue of several *Curiosities* found in *Virginia*; by Mr. Jo. Banister; and mention'd in some of his Letters to Dr. Lister. n. 198. p. 667.
6. Inquiries for *Hungary* and *Transylvania*; by - - - n. 25. p. 467.
7. Directions and Inquiries concerning the *Mines*, *Minerals*, *Baths*, &c. of *Hungary*, *Transylvania*, *Austria*, and other Countries neighbouring to these; by - - - n. 58. p. 1189.
n. 20. p. 360.
n. 19. p. 344.
8. Inquiries for *Turkey*; by Mr. H. n. 29. p. 554.
9. Promiscuous Inquiries sent to *Dantzick*; by - - -
10. Inquiries for *Greenland*; by - - -

11. Inqui-

n. 21. p. 426.
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16. p. 52.
17. p. 62.

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n. 23. p. 412.

11. *Inquiries for Persia*; by.
12. *Inquiries for Suratte, and other Parts of the East-Indies*; by.
13. *A Voyage of the Emperor of China into the Eastern Tartary*, An. 1682.
A Voyage of the Emperor of China into the *Western Tartary*, An. 1683.
An Explication, necessary to justify the Geography suppos'd in these Letters; by.
14. *Enquiries for Egypt*; by *Tho. Henshaw* Esq;
15. *Enquiries for Guiny*; by *Abraham Hill* Esq;
16. *Enquiries for Guaiana and Brasil*; by.

XXXVII. Accounts of Books Omitted.

1. **T**H. Bartholinus de *Peregrinatione Medica*, &c. *Haffnia*. 1674. in Fol.
2. *Caroli Claromontii*, M. D. &c. de *Aere, Solo & Aquis Anglia*; deque *Morbis Anglorum Vernaculis* Dissertatio: Nec non *Observationes Medicae Cambro Britannicae*. *Lond.* 1672. in 120.
3. *The natural History of Oxfordshire*, being an Essay toward the natural History of *England*; by *Rob. Plot*, L. L. D. *Oxford*. 1677. in Fol.
4. *The natural History of Staffordshire*; by *Rob. Plot*, L. L. D.
5. *Scotia Illustrata*; sive *Prodromus Historiæ Naturalis*, &c. Auth. *Rob. Sibbald*. *Equite Aurato. Edinburgi*. 1648. in Fol.
6. *An Account of the Islands of Orkney*; by *Ja. Wallace*. M. D. To which is added an Essay concerning the *Thule* of the Ancients. *Lond.* in 80.
7. *A Discourse of the state of Health in the Island of Jamaica*, with a Provision Calculated for the same, from the Air, the Place, and the Water; the Customs and manner of Living, &c. by *Tho. Trapbam*. M. D.
8. *New England's Rarities* discover'd; together with the Remedies used by the Natives to cure their Diseases, Wounds and Sores, &c. by *J. Josselin*, Gent. *Lond.* 1672. in 120.
9. *Description de la Louisiane, nouvellement Decouverte au Sud Ouest de la Nouvelle France*; par *Louis Hennepin*, Missionnaire Recollet, &c. à *Paris*. 1683. in 80.
10. *Observations Topographical, Moral, and Physiological*, made in a Journey through part of the *Low-Countries, Germany, Italy, and France*; by *J. Ray*. F. R. S. Whereunto is added a brief Account of *Fran. Willoughby*, Esq; his Voyage through a great part of *Spain*, *Lond.* 1673. in 80.
11. *Jo. Battista Donius* de *Restituenda Salubritate Agri Romani*.
12. *Historia Naturalis Helvetiæ Curiosa*. Auth. *Joh. Jacobo Magnero*, M. D. *Tiguri*.
13. A brief account of some Travels in *Hungaria, Servia, Bulgaria, Macedonia, Thessaly, Austria, Styria, Carinthia, Carniola, Friuli, &c.* by *Edward Brown*, M. D. *Lond.* in 40.

14. An account of several Travels through a great part of *Germany*; by *Edw. Brown*, M. D. Lond. 1676. in 4to. n. p. 130. 767.

15. A Collection of curious Travels and Voyages, in two Tomes: The first containing Dr. *Leonhart Ranwolff's* Itinerary into the *Eastern Countries*, &c. The second taking in many parts of *Greece*, *Asia Minor*, *Aegypt*, *Arabia*, &c. from the Observations of M. *Belon*, Mr. *Vernon*, Dr. *Spon*, Dr. *Smith*, Dr. *Huntingdon*, Mr. *Greaves*, and others. To which are added three Catalogues of *Plants* growing in the *Levant*. By *J. Ray*. n. 209. p. 768.

16. The History of *Poland* in several Letters to Persons of Quality: giving an Account of the Ancient and Present State of that Kingdom, Historical, Geographical, Physical, Political and Ecclesiastical, &c. with several Letters relating to Physick. Vol. I. To which is added a new Map of *Poland*. By *Bern. Connor*, M. D. Lond. 1697. in 8vo. n. 238. p. 98.

17. A Description of the Islands and Inhabitants of *Feroe*, &c. written in *Danish*; by *Lucas Jacobson Debes*, A. M. Englisht by *J. S. Dr. of Physick* in 120. n. 119. p. 456.

18. *Johannis Schefferi Laponia*, &c. *Frankfurti*. 1673. in 4to. n. 203. p. 371.

19. A Narrative of some Observations made upon several Voyages, undertaken to find a way for sailing about the *North* to the *East Indies*, and for returning the same way from thence hither: Together with Instructions given to the *East India Company*, for the Discovery of the famous Land of *Jesso*, near *Japan*. To which is added a Relation of sailing through the *Northern America* to the *East Indies*; by *Dirick Rembrantz van Nierop*, at *Amsterdam*. 1674. in 4to. abridg'd here. n. 109. p. 197.

20. Beschrijving der Oost Indische kusten, *Malabar*, *Coromandel*, *Ceylon*, &c. Door *Philippus Baldaus*. T. *Amsterdam*. 1672. in Fol. n. 80. p. 3088.

21. Relations of divers curious Voyages; by *M. Thevenot*. n. 14. p. 248.

22. Relation du Voyage de L' Evêque de *Beryte*, par le *Turquie*, la *Perse*, les *Indes*, &c. jusques au Royaume de *Siam*, & autres Lieux; par *M. de Bourges*. n. 89. p. 5128.

23. A Continuation of the Memories of *M. Bernier*, concerning the Empire of the *Great Mogul*. Englisht out of *French*. Lond. 1671. in 8vo. n. 18. p. 327.

24. The six Voyages of *John Baptista Tavernier*, Baron of *Aubonne*, through *Turky* into *Persia* and the *East-Indies*. In *English*. Lond. 1678. in Folio. n. 75. p. 2263.

25. A new Account of *East India* and *Persia*, in 8 Letters; being 9 Years Travels; begun 1672, and finished 1681, &c. by *J. Fryar*, M. D. Lond. 1698. in Fol. n. 129. p. 717.

26. Voyage de *Siam* des Peres *Jesuites*, Envoyez par le Roy aux *Indes* & a la *Chine*, a *Paris*. 1686, in 4to. n. 130. p. 751.

27. *Athanasii Kircheri China Illustrata*. n. 137. p. 942.

27. Hebdomas observationum de Rebus *Sinicis*; Auth. *Andrea Mullero Greiffenbagio*, *Colonia Brandenburgia*. An. 1674. n. 244. p. 338.

28. Nouveaux Memoires sur l' Etat Present de la *Chine*; par le L. P. *Louis le Conte*. S. J. *Amsterd*. 1697. in 120. 2. Vol. Translated into *English*, in 8vo. n. 25. p. 484.

- n. 48. p. 973. 29. An Historical Essay endeavouring a Probability, that the Language of China is the Primitive Language; by *J. Webb, Esq;* Lond. 1669. in 8o.
- n. 71. p. 2160. 30. Relatione dello State Presente dell' Egypto scritta dal. Sig. Gio. Michael Vansebio. In Parigi. in 1670 in 12o.
- n. 48. p. 972. 31. Historia General de Ethiopia a Alta; Perlo Padre Balthasar Tellez. Em Conimbra. An. 1660. in Fol.
- n. 14. p. 251. 32. The Causes of Inundation of the Nile; by *M. de la Chambre.*
- n. 8. p. 145. 33. If. Vossius de Nile & aliorum Fluviorum Origine.
- n. 17. p. 304. 34. Die Africanische Landschaft Fetu beschrieben; durck *Wilhelm. Johan. Muller.* von Hamburg; Gedruckt zu Hamburg. 1673. in 12o.
- n. 108 p. 182. 35. An account of several late Voyages and Discoveries to the South and North; towards the Streights of Magellan, the South-Seas, the vast Tracts of Land beyond *Hollandia Nova*, &c. also toward *Nova Zembla*, *Greenland* or *Spitsberg*, *Groyland* or *Engronland*, &c. by *Sir J. Narborough*, *Capt. Tasman*, *Capt. J. Wood*, and *Fred. Marten* of Hamburg. To which are annexed a large Introduction and Supplement. The whole Illustrated with Charts and Figures. Lond. 1694. in 8vo.
- n. 21 L. p. 166. 36. Voyages and Discoveries in South America: The first up the River of Amazons to Quito in Peru, and back again to Brazil; performed at the Command of the King of Spain, by *Christ. d' Acugna*. The second up the River of Plate, and thence by Land to the Mines of Potosi; by *M. Acarete*. The third from Cayenne into Guaiana, in search of the Lake of Parima, reputed the Richest place in the World; by *M. Grillet* and *Bechamel*. done into English from the Originals; being the only Accounts of those Parts hitherto extant, with Maps. Lond.
- n. 240. p. 196. 37. An Account of a new Voyage round the World; by *Will. Dampier*. Lond. 1697. in 8vo.

C H A P. IV.

Miscellaneous Papers.

A New Lamp;
by Mr. Rob.
Boyle. Ph Coll.
n. 2. p. 33.
Fig. 76.

- I. 1. A B C D. Is a Vessel of Latton, well Solder'd every where.
BC. EF. Are two Bottoms Solder'd to that Vessel.
F G. Is a Pipe Solder'd to the Bottoms aforesaid; and whose Aperture is in the Great Cavity, F A.
H. Is a Hole in the Pipe, F G. Opening between the two Bottoms, B C. E F.
I. Is another Hole, to which is Solder'd a Pipe, I G. bended upwards at, G.
P P. Is a little Vessel fit to receive the Wick of the Lamp.
L M. Is a slender Pipe, Open at both Ends, and Solder'd to the Cover, A D. in L. and to the Bottom, E F. in M. So that by that Pipe the External

ternal Air may communicate, between the two *Bottoms*, without penetrating into the *Cavity*, *AF*.

N. Is a short *Pipe*, folder'd to a *Hole* in the *Cover*, *AD*. So that thereby one may pour *Oyl* into the *Cavity* *AF*. and stop it afterwards very close with *Cork*.

For the filling up of this *Engine*, you must stop the *Aperture*, *G*. of the *Pipe*, *IG*. with a long *Pin* fitted for that purpose; and the upper End of the *Pipe*, *LM*. must be stopp'd too; then pour in your *Oyl* by the *Aperture*, *N*. which done, this same *Aperture*, *N*. is to be shut up exactly, and both the other to be opened, viz. *G*. and *L*. Then it will come to pass, that the *Oyl*, through the *Pipe*, *IG*. will run and fill the *Vessel*, *P*. till its superficies in the same *Level* with the *Hole*, *H*. and no more, as might be easily demonstrated.

Now it is easy to see that this *Lamp* is free from all *Inconveniencies* the *Lamp* of *Cardan* is subject to; for

1. The *Air* doth not get into it by Starts or Gluts, as it doth in *Cardan's Lamp*: But when the *Oyl*, in *PP*. being wasted by the *Flame*, comes to have its Superficies lower than the *Hole*, *H*. the *Oyl* from the *Cavity*, *AF*. runs into *PP*. gently, because its Place left in the *Cavity*, *AF*. is easily supplied by the external *Air*, which through the *Pipe*, *LM*. and the *Hole*, *H*. gets up into the said *Cavity*, *AF*.

2. When the *Air* contained in the *Cavity*, *AF*. comes to be rarefy'd by some *Heat*, it drives out much *Oyl*, and so is able to choak *Cardan's Lamp*: But in this, the *Oyl* being so driven out gets into the Space between the two *Bottoms*, as well as into the *Vessel*, *PP*. Now the said Space between the two *Bottoms*, by reason of its Largeness, receiving *Twenty* or *Thirty* times more *Oyl* than the *Vessel* *PP*. it follows, that the Superficies of the *Oyl* therein riseth 20 or 30 times less than if all the *Oyl* had been driven into the said *Vessel*. Therefore when we fill the *Lamp*, we must take Care that the *Pipe*, *L*. may be well shut, so that the *Air* between the two *Bottoms*, finding no Issue, may keep the *Oyl* from filling that Space, which by that means, when the *Hole*, *L*. is open, will be fit to receive the *Oyl* driven out by the Rarefaction of the *Air* in the *Cavity*, *AF*.

3. The *Oyl* being always kept at the same Distance from the *Flame*, the *Wick* will not be quickly consumed.

4. You have the conveniency to put new *Oyl* into the *Lamp*, without moving or extinguishing the same; for you need but shut up, *G*. and *L*. and pour the *Oyl* through *N*. as hath been said in the Beginning.

2. Let a *Lamp*, made 2 or 3 *Inches* deep, with a *Pipe* coming from the Bottom, almost as High as the Top of the *Vessel*, be fill'd first with *Water*, so high as to cover the *Hole* of the *Pipe* at the Bottom; to the end the *Oyl* may not get in at the *Pipe* (and so be lost:) then let the *Oyl* be poured in so as to fill the *Vessel* almost Brim full; which must have a *Cover* pierc'd with so many *Holes* as are design'd to be *Wicks*. When the *Vessel* is thus fill'd, and the *Wicks* are lighted, if *Water* fall in by Drops at the *Pipe*, it will keep the *Oyl* always at the same Height, or very near, the

Another, by Dr.
Rob. St. Clare.
n. 245. p. 380.

weight of *Water* to that of *Oyl* being, according to *Kircher's Table*, 20¹/₂ to 19. which in 2 or 3 *Inches* will make no considerable Difference. If the *Water* runs faster than the *Oyl* wastes, it will only run over at the Top of the *Pipe*; what does not run over, will come under the *Oyl*, and keep it to the same Height.

Perpetual Lamps
in Imitation of
the Sepulchral
Lamps of the An-
cients; by Dr.
Rob. Plot. n.
166. p. 806.

II. I have often heard it asserted that a *Metalline Wire*, especially of the best refined *Gold* (whose Prerogative is, not to be diminish'd by *Fire*) will lick up *Oyl*, and so make a *perpetual Flame*, provided it be supplied with a *perpetual Oyl*: But I found (upon *Tryal*) in a *Faggot* of *Wire* made of anneal'd *Iron*, of a suitable Bigness for a *Wick*, it would not succeed by any manner of means I could readily think of; nor have I much Reason to think it will, either in *Wire* of *Silver* or *Gold*, the Nature of them all seeming not much different, as to this Particular. If therefore it be necessary, that we must have a *perpetual Wick* for the making such *perpetual Sepulchral Lamps*, as were used by the *Ancients*, I think we must make use of *Linum Asbestinum*, *Earth Flax*, or *Salamanders Wool*, which will do the Office of a *Wick* tolerably well; and if it can any way be supplied with a *perpetual Oyl* (as I shall presently shew you) I hope you will not judge me far from effecting the Matter. Now that there may be such a *Bitumen* or *inexhaustible Oyl*, I will carry you no further than *Pitchford* in *Sbropshire*, to shew you: For there is a *Naphta*, or *Liquid Bitumen*, that constantly issues forth with a *Spring* there, and floats upon the *Water*. This I would have separated before it joyns with the *Water*, into a *Ductus* of its own, and so conveyed to the Place, thought most convenient for such a *Lamp*, into which it should as *perpetually* distill, as it does now into the *Fountain*; which, I doubt not, may be done without any great matter of Difficulty: And if so, we have an *Oyl* as *everlasting* as our *Wick*. Nor need we to fear any *Extinction* if inclosed in a *Tomb* or *Vault* under Ground, in never so damp or moist a Place: It being the *Characteristick* of a *Bitumen*, to burn best where there is Moisture; as is evident upon Affusion of *Water* upon *Sea-Coal*. And this is one way I have thought of that such a *perpetual Sepulchral Lamp* might possibly be contrived.

But if you will be so strict with me, as not to allow this to be a *perpetual Wick*, or that 'tis probable one should be made any other way; as unlikely may it seem, that there was ever any such thing as a *perpetual Lamp*, notwithstanding the Testimonies of *St. Austin*, *Plutarch*, *Pliny*, *Ludovicus Vives*, *Baptista Porta*, *Licetus*, *Pancirollus*, and divers others; whereof some are said to have burnt 1000, some 1500 *Years*. But I dare not think so many, and so very good Authors, have all imposed upon us; or that 'tis almost possible that so many notable Instances as are brought for them, should all be false. Much rather therefore shall I determine (than wholly explode the thing) that the *Liquor* of these *Lamps* did burn without any *Snuff* or *Wick* at all; as we see *Camphore* and most *Bitumens* will: It not being exprest (that I remember) in any of the Relations of these

Vid. Vol. II. Cap.
III. S. 8. XCII
• XCIII.

these *Lamps* that they were found with any *Wicks*; whence both the Inconveniencies above-mentioned attending a *Wick*, *ipso facto* cease. It only therefore remaining, that we find out an *inexhaustible Oyl*, which conveyed to a fit Vessel might cause such a *Lamp*, why may not our *Bitumen at Pitchford* serve the Turn? Which no question will burn without a *Wick*, as well as any other *liquid Bitumen*. All the Objections I can foresee that is likely to obtain Advantage against such an Experiment, is that such a *Lamp* as this, would as likely burn in the open Air, as in an inclosed damp Vault, whereas the *Lamps* of the *Ancients* did nourish their *Flame* best, where there was most Want of Air, only in close Vaults and Tombs, and were presently extinguish'd upon the least Immission of external Air; these being Qualities necessary, and almost always asserted as Concomitants of the *Ancient Sepulchral Lamps*. To which I answer first, that some of the *Lamps* of the *Ancients*, did as well burn in the open Air, as in close damp Vaults; as that mentioned by St. *Austin* in his Book *de Civitate Dei*, which hung in the Temple of *Venus* always exposed to the open Weather, yet was never either consumed or extinguish'd. The *Lamp* also found in the Tomb of *Pallas* the *Arcadian*, slain by *Turnus* in the *Trojan War*, was of this Kind, which remained Burning after it was taken forth, notwithstanding either Wind or Water, with which some did endeavour to quench it. Now admitting our *Lamp* at *Pitchford* should thus burn indifferently, under both Circumstances, what are we the worse? Since I never heard that the *Lamp* mentioned by St. *Austin*, or of *Pallas*, were ever the less esteemed or admired, because they could not be extinguish'd by the open Air, as most of the rest have been said to be.

But if any Body be so nice that he must have an *Oyl*, in all Particulars answerable to that other sort of the *Ancients*, that burns best where there is want of Air, and is destroyed by its Admission; let him but go with me into *Flintshire* to the Coal-works of Sir *Roger Moslyn* of *Moslyn* in that Country, and he may have Satisfaction; where the *Miners*, when they have dug so deep, that they begin to perceive a want of Air, find a bluish Flame to begin to kindle of it self in the Fissures of the Coal (they sometimes light their Candles) which blazes and moves up and down continually, and sometimes shines too upon the Surface of the Water in the Bottom of the Pits, shewing all the Colours of the *Rainbow*; which yet upon drawing up of the Water that annoys the Works, and thereby stirring the Air, will leave Burning: But as they sink lower, and are more remote from the Day, or *Super-terranous Air*, still encreases upon them. Whence it plainly appears, that this is a sort of Fire that so little requires Air for the maintenance of it, that it burns best when there is least Air, and is extinguish'd when disturb'd by the Motion of it; as the *Ancient Lamps* are said to be upon the Immission of external Air. The same sort of Fire has also been taken Notice of, in the Coal works of *Somersetshire*, by the ingenious Mr. *Beaumont*; and by Mr. *George Sinclair* in the Coal-works of *Scotland*. This I doubt not but you will readily allow me to be as probable a Material for the *Oyl* of this second sort of perpetual Lamps, as that of *Pitchford* was, for the

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VII. 4.

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Sect. VIII:

the former: But how, This or That, shall be so managed, as to be put into a *Lamp*, and this *Lamp* perpetually supplied, and placed where-ever it shall be desired; as it seems the *Lamps* of the *Ancients* might; this *Fire* being sometimes found in little *Pots*, *Glasses*, or *Urns*, without any such *Ductus* to them, as we required at *Pitchford*, or might do here; is a Difficulty perhaps not so easily conquer'd. To which I must confess that I have only this to say, that unless there can be a Preparation chymically made out of these *bituminous* Materials, which thus naturally *take Fire* of themselves, or preserve it without a *Wick*, a small Quantity whereof shall maintain so tenuous a *Flame*, as that there shall be no considerable Consumption of the matter in many *Years* (such as the *Flame* over the *Well*, and *Earth* about it, in one Mr. *Hawkley's* Ground in *Lancashire*, that (like the *Fire* of *Plato*) only *shines* and does not *burn*) we must be contented to be tyed to the Places where these Materials are.

But if we can be content to quit these Materials; and to think that these *Lamps*, (as many have done) did not *shine* or *burn* for all the Time they were inclosed in those *Tombs*, but were only *inkindled* by the Admission of *Air* when opened, I have thought of a way not at all lyable to any of the Defects or Inconveniencies of the two former Ways; whereby a *Glass* of *Liquor*, inclosed in another (like the *Urns* of *Olybius*) upon Immission of external *Air*, shall certainly *shine*, though it did not so before. And 'tis this; take a small *Phial*, into which put a little of the *liquid Phosphorus* (which you all know, if the *Phial* be stoppt, *shines* not at all; (include this in the *Recipient* of an *Air-Pump*, out of which if the *Air* be well exhausted, the *solid Phosphorus* it self will leave off *shining* in 10 *Hours* time, tho' in the *Summer-Quarter*, and the *Liquid* in fewer; so that it shall shine no more, than when the *Bottle* containing it is stoppt with a *Cork*. Now let such an exhausted *Recipient*, with the included *Phosphorus*, be placed in a *Tomb* or *Vault*, which are commonly *Dark*, and if ever found, and the outer *Glass* broken, (as usually such things are, by ignorant Men imploy'd in digging) possibly there will appear, upon immission of the *Air*, as good a perpetual *Lamp*, as some that have been found in the *Sepulchres* of the *Ancients*; though in all probability of a different Kind, from all, or most of them.

An Account of
an Engine that
consumes Smoak;
by M. Justel. n.
181. p. 78.

III. M. *Dalesme* has found out a *Machine*, which though very little and portable, consumes all the *Smoak* of all sorts of *Wood* whatsoever; and that so, that the most curious *Eye* cannot discover it in the Room, nor the nicest *Nose* smell it, altho' the *Fire* be perfectly open. This *Engine* is composed of several *Hoops* of hammered *Iron*, of about 4 or 5 *Inches* Diameter, which shut one into the other: It stands upright in the middle of the Room, upon a sort of *Trevel* made on Purpose; *A*, is the place where the *Fire* is made, where if you put little pieces of *Wood*, it will not make the least *Smoak*, neither at *A*, nor *B*. Over which you cannot hold your Hand within half a *Foot*, there comes out so great a *Heat*. If you take

take one of these pieces of *Wood* out of the *Fire* at *A.* it *Smoaks* presently, but ceases immediately so soon as it is cast into the *Fire* again. The most *Fetid* things, as a *Coal* steeped in *Cats-piss*, which *stinks* Abominably when taken out of the *Fire*, notwithstanding in this *Engine* makes not the least ill *Scent*; the same did *red-Herrings* broiled thereon. On the other side all *Perfumes* are lost in it, and *Incense* makes no *Smell* at all, when *Burnt* therein. We learnt, that this is not shown, but when the *Fire* at *A.* is well kindled, and the *Tunnel B D.* very *Hot*, so that the *Air* that feeds the *Fire*, cannot come that way, but must all press in upon the open *Fire*, whereby the *Smoak* and *Flame* is all forced Inwards, and must pass through the heap of *Burning Coals* in the *Furnace, A.* in which *Passage* the parts thereof are so dispersed and refined, that they become *Inoffensive* both to the *Eyc* and *Noise*.

IV. The best Remedies against *Cold* are such as retain *Heat*, or Continue *Fire* longest. To this purpose some have taken notice, that *Joyners* use *Leaden Pots* for their *Glue*, alledging for a Reason, that *Lead* being a close *Mettal*, retains the *Heat* longer than other *Mettals*. *Cary's warming Stone* promised a warmth for 6 or 8 *Hours*; if it performed but for 2 or 3 *Hours*, it would be of great Use. 'Tis found by sad Experience, how hurtful *Bright Fires*, and especially of *Stone Coal*, are to the *Eyes*.

Some Suggestions
for Remedies
against Cold,
by . . . n. 21,
p. 379.

To retain *Fire* long, certain *Black Earths* are useful; as we were lately informed by the Inquisitive *Dr. B.* That a Gentleman in *Somersetshire* call'd *Mr. Speke*, had bountifully obliged *Ilminster*, and his Neighbourhood, by a *black fat Earth* lately found in his *Park*. But the same Correspondent adds, that he never saw any Parallel to a *Sea-weed*, which he and his Fellow Students had in *Cambridge*, in the Mouth of a *Barrel* of good *Oysters*, it was smaller than *Pease-halm*, yet cut, it lasted 2 very great *Fires* of *Sea Coal*, burning bright in the midst of the *Fire*; and by a stroak of the *Tongs*, it fell into the *Hearth*, *Jingling* like *Mettal*.

V. *May, 5. 1665.* Fresh *Mackrels* were boyl'd in *Water*, with *Salt* and *Sweet Herbs*; and, when the *Water* was perfectly *Cold*, the next Morning, the *Mackrels* were left in the *Water* for *Pickle*.

Observations on
Shining Fish, by
Dr. Beal. n. 13,
p. 226.

May 6. More fresh *Mackrels* were Boy'd in like *Water*; and *May 7.* both *Water* and *Mackrels* were put into the former *Water*, together with the former *Mackrels*. (Which Circumstances I do particularize, because whether the Mixture of the *Pickle* of several Ages and a certain Space of Time, or what ever else was Necessary, and wanting, the Tryal did not succeed with the like Effect at other Times)

But now on *May 8 Evening*, the Cook stirring the *Water*, to take out some of the *Mackrels*, found the *Water* at the first Motion become very *Luminous*, and the *Fish* shining through the *Water*, as adding much to the *Light* which the *Water* yielded. The *Water*, by the Mixture of *Salt* and *Herb*,

Herbs in the Boyling, was of it self thick and rather *blackish*, than of any other Colour; yet being stir'd it *Shined*, and all the *Fish* appear'd more brightly *Luminous* in their own Shapes.

Wherever the Drops of this Water (after it was stir'd) fell on the Ground, or Benches, they *Shined*: And the Children took Drops in their Hands, as broad as a *Penny*, and running with them about the House, and each Drop both near and at distance, seem'd, by their *Shining*, as broad as a *Six pence*, or a *Shilling*, or broader.

The Cook turned up the side of the *Fish* which was lowest, and thence came no *Shining*: and after the Water was for some good time settled, and fully at Rest, it did not *Shine* at all.

On Tuesday night May 9. we repeated the same Tryal, and found the same Effects. The Water, till it was stir'd gave no *Light*, but was thick and Dark, as we saw by *Day Light*, and by *Candle-Light*: As soon as the Cook's Hand was thrust into the Water, it began to have a *Glimmering*; but being gently stir'd by the Hand moving round, it did so *Shine*, that they who looked on it at some distance, from the further end of another Room, thought verily it was the *Shining* of the *Moon* through a Window upon a vessel of *Milk*; and by brisker Circulation it seem'd to *Flame*.

The *Fish* did then *Shine* as well from the inside as the outside, and chiefly from the *Throat*, and such places as seemed a little broken in the boyling. I took a piece, that *Shined* most, and fitted it as well as I could devise in the Night, both to my great *Microscope*, and afterwards to my little one: But I could discern no *Light* by any of these *Glasses*, nor from any Drops of the *Shining* Water, when put into the *Glasses*. And May 10. in the brightest Rays of the *Sun*, I examined in my great *Microscope*, a small broken piece of the *Fish*, which *Shined* most the Night before; We could find nothing on the Surface of the *Fish* very remarkable. It seem'd *Whitish*, and in a manner Dried, with deep Inequalities; and others, as well as my self, thought, we saw a Steam, rather *Darkish*, than *Luminous*, arising, like a very small Dust, from the *Fish*: And rarely, here and there, a very small and almost Imperceptible *Sparkle* in the *Fish*. Yet of these *Sparkles* we are certain; we numbred them, and agreed in the Number, Order, and Place. Of the *Steam* I am not Confident, but do suspect our *Eyes* in the *bright Sun*; or that it might be some *Dust* in the *Air*.

The great *Microscope* being fitted in the Day-light for this piece of *Fish*, we examined it that Night, and it yielded no *Light* at all, either by the view of the *Glass*, or otherwise.

Finding it *Dry*, I thought that the Moisture of the *Spittle*, and touching of it, might cause it to *Shine*: And so it did, though but a very little in a few small Sparks, which soon *Extinguish'd*. This we saw with the bare *Eye*, not in the *Glass*.

The *Fish* were not yet *fetid*, nor insipid to the best discerning Palats: And I caused two *Fish* to be kept for further Tryal, 2 or 3 Days longer till

till they were *fetid* in very hot Weather; and then I expected more *Brightness*, but could find none, either in the *Water* by stirring it, or in the *Fish*, taken out of the *Water*.

VI. 1. May. 15. 1671. When I was about to go to Bed, an *Amanuensis* of mine informed me, that one of the Servants of the House, going upon some occasion into the *Larder*, was frighted by something of *Luminous* that she saw (notwithstanding the darkness of the place,) where the *Meat* had been hung up before: Whereupon I presently sent for the *Meat* into my Chamber, and caused it to be placed in a corner of the Room being made considerably dark, and then I plainly saw, both with wonder and delight, that the Joynt of meat did in divers places *shine* like *Rotterwood* or *Stinking Fish*. The chief Circumstances and *Phanomena*, that I had Opportunity to take notice of, at so Inconvenient an Hour, were these.

Observations
how Shining
Flesh, by Mr.
Rob. Boyle
n. 89. p. 5108.

1. That the Subject, we discourse of, was a *Neck of Veal*, which had been bought of a Country-Butcher on the *Tuesday* proceeding

2. In this one piece of *Meat* I reckoned distinctly above 20 several places that did all of them *Shine*, though not all of them alike, some of them doing is but very faintly.

3. The bigness of these *Lucid* Parts was differing enough, some of them being as big as the *Nail* of a Man's middle *Finger*, some few bigger, but most of them less. Nor were their *Figures* at all more uniform, some being inclined to a *Round*, others almost *Oval*, but the greatest part of them very Irregularly shap'd.

4. The parts that *Shone* most, were some *Grissly* or soft parts of the *Bones*, where the *Butcher's cleaver* had passed: But these were not the only parts that were *Luminous*; for by drawing to and fro the *Medulla, Spinalis*, we found that part of that also did not *Shine* ill: And I perceived one place in a *Tendon* to afford same *Light*; and lastly 3 or 4 spots in the *Fleshy* parts at a good distance from the *Bones*, were plainly discovered by their own *Light*, though that were fainter than in the parts above-mentioned.

5. When all these *Lucid* parts were survey'd together, they made a very splendid shew: So that applying a Printed Paper to some of the more *Resplendent Spots*, I could plainly read divers Consecutive *Letters* of the *Title*.

6. The colour that accompanied the *Light* was not in all the same: But in those which shone Liveliest, it seem'd to have such a fine *Greenish Blue*, as I have divers times observed in the *Tails* of *Glowworms*.

7. But notwithstanding the vividness of this *Light*, I could not by the touch discern the least Degree of *Heat* in the parts whence it proceeded; and having put some marks on one or two of the more *Shining* places, that I might know them again when brought to the *Light*, I apply'd a *Seal'd Weather-Glass*, furnished with *Tinted Spirit of Wine*, for a pretty while, and could not satisfy myself, that the *Shining* parts did at all sensibly warm the *Liquor*.

8. Notwithstanding the great Number of *Lucid* parts in the Neck of *Veal*, yet neither I, nor any of those that were about me, could perceive by the *Smell* the least degree of *Stink*, whence to infer any *Putrefaction*; the *Meat* being judged very fresh, and well conditioned and fit to be dressed.

9. The Floor of the *Larder* where this *Meat* was kept, is almost a Story lower than the Level of the Street, and 'tis divided from the Kitchen but by a partition of boards, and is furnished but with one Window, which is not great, and looks toward the Street, which lies *Northward* from it.

10. The *Wind*, as far as we could observe it, was then at *South West*, and blustering enough. The *Air* by the seal'd *Thermoscope* appeared hot for the Season. The *Moon* was past its last *Quarter*. The *Mercury* in the *Barometer* stood at $29\frac{3}{8}$ Inches.

11. We cut off with a Knife one of the *Luminous* parts, which proved to be a tender *Bone*, and being of about the thickness of a half *Crown* piece, appeared to *Shine* on both sides though not equally; and that part of the *Bone* whence this had been cut off, continued Joyned to the rest of the Neck of *Veal*, and was seen to *Shine*, but nothing near so vividly as the Part we had taken off did before.

12. To try, whether I could obtain any *Juice* or moist Substance from this, as I have several times done from the Tails of *Glowworms*, I rub'd some of the softer and more *Lucid* parts, as dexterously as I could, upon my Hand, but I did not at all perceive any *Luminous Moisture* was thereby imparted; though the *Flesh* seem'd by that Operation to have lost some of its *Light*.

13. I caused also a piece of *Shining Flesh* to be compressed betwixt two pieces of *Glass*; but I did not find the *Light* to be thereby *Extinguish'd*.

14. I put a *Luminous* piece of *Veal* into a *Chryselline* Phial; and pouring on it a little pure *Spirit of Wine*, after I had shaken them together, I laid by the *Glass*, and in about a *Quarter* of an *Hour* or less I found that the *Light* was *vanish'd*.

15. But *Water* would not so easily quench our seeming *Fires*; for having put one of them into a *China Cup*, and almost fill'd it with *Cold Water*, the *Light* did not only appear, perhaps undiminished, through that *Liquor*, but above an *Hour* after was vigorous enough not to be *Eclips'd* by being looked upon at no great distance from a burning *Candle*.

16. While these things were doing, I caused the *Pneumatical Engine* to be prepared in a Room without Fire, (that the Experiment might be tryed in a greater degree of *Darkness*;) and having convey'd one of the largest *Luminous* pieces into a small *Receiver*, we caused the *Pump* to be plied in the *Dark*, and perceived upon the Gradual withdrawing of the *Air*, a Gradual lessening of the *Light*; which yet was never brought quite to disappear (as I long since told you the *Light* of rotten *Wood* and *Glowworms* had done,) or to be so near *Vanishing* as one would have expected. But by the

the hasty Increase of *Light*, that disclosed it self in the *Veal* upon this letting in of the *Air* to the *exhausted Receiver*, it appeared more manifestly than before, that the Decrement, though but slowly made, had been considerable. This Trial we once more repeated with a not unlike Success; which though it convinced us, that the *Luminous* matter of our included Body, was more vigorous or tenacious than that of most other *shining Bodies*; yet it left us some Doubts, that the *Light* would have been much more impaired, if not quite made to *vanish*, if the Subject of it could have been kept long enough in our *exhausted Receiver*.

17. It was also found that a *Legg* of the same *Veal*, had some *shining Places* in it; though they were but very few and faint in Comparison of those, that were conspicuous in the above-mentioned *Neck*.

18. *March 16.* Between 4 and 5 in the Morning I lookt upon a clean *Phial*, that I had laid upon the Bed by me after a piece of our *Luminous Veal* had been included in it, and found it to *Shine* vividly. I lookt upon it again the 3d Day (inclusively) after we had first observed the *Meat*, 'twas cut off from, to be *Luminous*, and I found it to *shine* in the Dark as vigorously as ever. The 4th Day its *Light* was also conspicuous; so that I was able in a dark Corner of the Room to shew it even in the *Day Time* to 3 or 4 very ingenious Physicians. But before the Night following the *Light* began to decay, and the offensive *Smell* to grow somewhat strong; which seems to argue, that the Disposition, upon whose account our *Veal* was *Luminous*, may very well consist both with its being and not being in a State of *Putrefaction*, and consequently is not likely to be derived merely from the one or the other. The 5th Day, in the Morning looking upon it before the Curtains were opened, it seem'd to *shine* better than it had done the Day proceeding. The same Night also it was manifest enough, though not vivid, in the Dark. When I awaked the 6th Day in the Morning after the *Sun* was *risen*, I could within the Curtains perceive a glimmering *Light*: But the 7th Day, I could not late at Night discern any *Light* at all.

19. I shall only add and conclude with one Observation more, which may possibly take off our Thoughts from striving to deduce the *shining* of our *Veal* from the peculiar *Nourishment*, or *Constitution*, or *Properties* of that individual *Calf*, whose *Flesh*, &c. was *Luminous*: For, having several Nights sent purposely into the Larder, to observe, whether any *Veal*, since brought thither, or any other *Meat*, did afford any *Light*, a negative Answer was always brought me back; save at one time which happened to be within less than 48 Hours of that, at which the *Luminousness* of the *Veal* had been first taken Notice of; for at this time there was in the same Larder a conspicuous *Light* seen in a *Pullet*, that hung up there, which having caused to be brought up in a darkened Place in my Chamber in the Night time, I perceived 4 or 5 *luminous Places*, which were not indeed near so large as those of the *Veal*, but were little less *Vivid* than they: All of these I took Notice to be either upon or near the *Rump*; and that which appeared

most like a Spark of Fire, *shone* at the very Top of that Part. Yet was not this Fowl *mortified*, nor at all *ill-scented*, but so fresh, that the next Day I found it very good Meat.

By Dr. J. Beal.
n. 125. p. 599.

2. 1. Upon Friday, (Feb. 25, 1671.) a Woman of Teovil in Somersetshire bought in the Market a Neck of Veal, which seem'd well coloured, and well conditioned in every respect: The Calf, a Cow Calf, was kill'd in the Evening the Day before, it was hung to a Shelf in a little Chamber, where she and her Husband lay; upon the following Saturday, about 9 in the Night, the Neck of Veal *shined* so bright, that it did put the Woman into a great Affrightment. She calls up her Husband; he hastens to the Light as fearing Fire and Flames, and seeing the Light come only from the *Flesh*, he caught the *Flesh* in his left Hand, and beat it with his right Hand, as endeavouring to extinguish the *Flame*; but without effect. The *Flesh* *shined* as much, if not more, than before, and his Hand, with which he beat the *Flesh*, became all in a *Flame*, as bright and vivid as the *Flesh* of the Veal was, and so it continued, whilst he went from Place to Place, shewing it to others. Then he thrusts his *blazing* Hand into a Pail of pure Water; this could not extinguish the *Flame* at all, but his Hand *shined* through the Water. At last he took a Napkin, and wiped his Hand, till he wiped off all the Light. The next Day (being Feb. 27.) the Veal was dressed, and some of the Neighbours, who saw it *shining*, were invited to eat of it; all esteem'd it as good, as any they had eaten. A Part of it was kept for Feb. 28, and 29, in which time it lost nothing of its Sweetness.

2. And now I want not a Parallel in Confort for that part of this Relation, which seemeth strangest: For on Tuesday (being April 4. 1676.) a fat Pork was kill'd for my Family; within two Days, the Guts, or (as some call them) the Chitterliags, and Feet of the Pork were boyl'd, and after they were thoroughly cold, they were put, in due order, in *Souse-drink*, or *Pickle*, in a low Room on the North-side, which had little Light at Mid-day, and was very dark, as soon as Night began, Apr. 8. all those Parts of the Guts, and the Claws of the Feet, which floated on the Top of the *Pickle*, began to *shine*, and the Parts immerst under Water gave no Light, the Light encreased daily more and more in all the Parts that floated. April 13. the Light seemed as bright as the brightest Moon-shine. Thus it continued to *shine* (but fainter and fainter, and in fewer Parts) almost a Week longer; for, being often tumbled up and down, by slow Degrees all sunk into the *Pickle*, and then all the Light expired. Whilst the Light was vivid, I caused a Maid-servant to rub one of her Hands upon the *shining* Part; after which, she came through 3 Rooms, into the Place where I sate, between a great Fire on one side, and a Candle or two on a Table near at Hand, on the other side; and in this Place she shewed me her Hand, all over *shining*, as bright as Moon-shine; one indeed stood between her Hand and the Fire, another between her and the Candles. Thence I went into another Room, where there was but a small Fire, and no Candle, but (at that time) a little Moon-shine through a Window; there the *shining* Parts of her Hand, or indeed her Hand all over, appeared
to

to be very bright *Flames*. Then I caused some of the *shining Pork* to be brought into the same Room, and examined, whether the *Pickle* did not *shine*, and so might give the *flaming Tincture* to the Maids Hand; but by wiping the *Pork* diligently with a Napkin, till it was perfectly dryed, we found that the *Flame* of the *Pork* was rather encreased, (as we all thought) than diminished. Then I desired all the Company, (whereof some were young Children, which have the tenderest *Touch*) to try, whether the most *flaming Parts* had any perceptible degree of *Tepidity*; all agreed, that they could feel no Warmth, and that all the *Parts* of the *Pork* were manifestly *gelid*; but some thought that they perceived the *luminous Parts* less *gelid* than the *dark Parts*, others denied it: For my own part, I found not so much Difference, as could clear me from suspecting a prepondering *Fancy*. After these *Trials*, the Maid wiped off the *Light* from her hand, by rubbing her Hand strongly with a Napkin, 3 or 4 times over.

2. I took Notice, that by this acquired *Blaze*, the Face and Hands would appear a great deal larger than they were; and the manner how it was done being concealed, the Learned and Ingenious might be at a loss to discover what it might be; so that it might fitly serve for an *Imposture*.

4. Histories report of a suddain and short *Fulgor* about the Countenance of the *Living*, which they interpreted to presage something extraordinary, by which those Persons became illustrious; but of *dead Carcasses*, which became thus *luminous*, I have read nothing in old *Records*. That *Mackrels* in their *Pickle*, did cast a *shining Blaze*, some Days before they were *Ill-Tasted*, or *Ill-scented*, I gave you Notice May 5. 1665. since which Vid. Sup. Sect. V. Time I tried often to obtain the like, but without Success; though I know not what Circumstance was wanting.

5. The *Pickle* in which the *Pork* was put was made only of pure *Water*, *Bran*, and *Bay Salt*, and was so far from *shining*, that it quencht the *Light* by Degrees of the *shining Flesh*. The *Mackrel-Pickle* (which was boil'd with a Mixture of sweet *Herbs*) by a little stirring became so *luminous*, that a Drop of it in the Palms of Childrens Hands appeared as broad as a *Shilling*, or broader; so that a Wash of it might also fitly serve for an *Imposture*.

6. I think *shining Worms* are seldom found in *Oysters*, as was formerly Vid. Vol. II. Chap. VI. Sect. LXIII. observed by M. *Auzout*. And perhaps one may wait a long Day, before he shall see such a long lasting *Light* in the *Iceland-Seas* as was remarked by *Bjornonius*. So that I cannot wonder, if expert *Chymists* do by some Vid. Sup. Chap. III. Sect. XXVI. Chance obtain more, than by *Art* and much *Diligence* they can repeat again, since they deal with such fickle Agents, as *Fire* and *Flame*. I have heard of some *Dews* on Meadows, *shining* in the early Morning, before Day Light; but those more frequently. These and much better, some of Mr. *Boyle's* Instances in his *Pneumatical Experiments*, and more in his Dis-Exp. 37. course of *luminous Gems* at the end of his elaborate *Treatise of Colours* may, at least, by Resemblances, instruct us to apprehend the Nature of some *shining Meteors* among the Clouds, or in our lower Region, of which, they say, some have a *singeing Heat*, and do *blast*; and that some are to the torch *Gelid*, yet do *poysen* or *corrupt* our *Flesh*.

7. I shall only add, That I gave full Warning to observe whether the *Light* in my two Instances had any *blewish* or *greenish Tincture*; all that saw both, affirmed the *Light* to be as clear as the brightest *Moon-shine*, and so it appeared to my own Eyes; and I can perfectly remember, that I really thought the Beams which came from the *Mackrel*, and the stirred Pickle, to be bright *Moonshine*, till a Servant brought me to the *Vessel*, to see the contrary.

Postscript. We had a Report (whether true or false, you may best know) of *shining Beef* in the *Strand*, about the same time, when the *Neck of Veal*, first mention'd, shined here. And it was here observed, that the *Stars* had a glaring Frightness, and Largeness, more than ordinary, and for some *Months* before, and ever since, the *Weather* hath been more gentle, warm, and dry, than is usual in these *Months*; but 'tis above my Skill to demonstrate, how this belongs to the Matter in hand. Note, that the *Mackrel-Pickle* was thick, and not transparent, till it was stirred and flaming; the *Pork Pickle* was clear, or transparent, yet *shined* not in any part.

Observations
about the Resem-
blances and Diffi-
rences between a
Burning Coal and
Shining Wood,
by Mr. Robert
Boyle, n. 32.
p. 605.

Resemblances.

Vid. Vol. II.
Sect. LXXVI.

VII. The Things, wherein I observed a piece of *shining Wood* and a *burning Coal* to agree or resemble each other are principally these five.

1. Both of them are *Luminaries*, that is, give *Light* as having it (if I may so speak) *residing in them*, and not like *Looking-Glasses* or *white Bodies* which are conspicuous only by the incident Beams of the *Sun*, or some other *luminous Body*, which they reflect.

This is evident, because both *shining Wood* and a *burning Coal* shine the more vividly, by how much the Place wherein they are put is made the darker, by the careful Exclusion of the adventitious *Light*.

2. Both *shining Wood* and a *burning Coal* need the Presence of the *Air* (and that too of such a *Density*), to make them continue *shining*.

This has been proved as to a *Coal*, by what I long since published in my *Physico Mechanical Experiments*: And as to the *shining Wood*, the Experiments I have lately sent you, make it needless for me to add any other proof of the Requisite, not only of *Air*, but of *Air of such a Thickness*, to make its *Light* continue.

3. Both *shining Wood* and a *burning Coal*, having been deprived for a time of their *Light*, by the withdrawing of the contiguous *Air*, may presently recover it by letting in fresh *Air* upon them.

The former Part of this, particular Tryals have often shewn you to be true, when kindled Coals, that seem to be *extinguish'd* in our exhausted *Receivers*, were presently revived, when the *Air* was restored to them: And the latter Part is abundantly manifest by the Experiments above mentioned.

4. Both a quick *Coal* and *shining Wood* will be easily quenched by *Water* and many other *Liquors*.

The Truth of this, as to Coals, is too obvious to need a Proof, and therefore I shall confirm it only as to *Wood*; for which purpose you may be pleased to take the following Transcript of some of my Notes about *Light*.

I took

I took a piece of *Shining Wood*, and having wetted it with a little Common *Water* in a clear *Glass*, it presently lost all its *Light*.

The like experiment I tried with strong *Spirit of Salt*, and also with a Weak *Spirit of Sal Armoniack*; but in both, the *Light* did upon the *Woods* imbibing of the *Liquor* presently *Disappear*.

I made the like *Trial* with *Rectified Oyl of Turpentine*, with a not unlike Success. The same Experiment I tried more than once with high *Rectified Spirit of Wine*, which did immediately destroy all the *Light* of the *Wood* that was immersed in it; and having put a little of that *Liquor* with my Finger upon a part of the whole piece of *Wood* that *Shone* very Vigorously, it quickly did, as it were *Quench* the *Coal* as far as the *Liquor* reached; nor did it in a pretty while, if at all, regain its *Luminousness*.

5. As a *Quick-Coal* is not to be *extinguish'd* by the Coldness of the *Air*, when that is greater than ordinary; so neither is a piece of *Shining Wood* to be deprived of its *Light* by the same quality of the *Air*.

As much of this Observation as concerns the *Coal*, will be readily granted, and for proof of the other part of it, this one *Trial* may suffice, which I shall now relate.

I took a small piece of *Shining Wood*, and put it into a slender glass Pipe, *Scaled* at one end, and open at the other, and placed this Pipe in a Glass Vessel, where I caused to be put a strongly *Frigorifick* Mixture of *Ice* and *Salt*, and having kept it there full as long as would be requisite to *Freeze* an *Aqueous Body*, I afterwards took it out, and perceived not any sensible Diminution of its *Light*. But though the *Light* of *Shining Fish* be Usually (as far as I have observed) more Vigorous and durable than that of *Shining Wood*; yet I cannot say, that it will hold out against *Cold* so well as the other: For having ordered one of the Servants to cut off a good large piece of a *Luminous Whiting*, and bury it in *Ice* and *Salt*, when I called for it in less than half an Hour after, I found it much stiffened by the *Cold*, and to have no *Light*, that I could discern in a place *Dark* enough. And for fear that this Effect may have proceeded not barely from the Operation of the *Cold*, but also from that of the *Salt*, I caused another time a piece of *Whiting* to be put in a Pipe of Glass *Seal'd* at one end, and having seen it *Shine* there, I looked upon it again, after it stayed about a quarter of an Hour, by my estimate, in a *Frigorifick* mixture, which the glass kept from Touching the *Fish*; and yet I could not perceive in a *Dark* place, that it retained any *Light*.

1. The first Difference I observed betwixt a live *Coal* and *Shining Wood* is, that whereas the *Light* of the former is readily *Extinguishable* by Compression (as is obvious in the Practice of suddenly *Extinguishing* a piece of *Coal* by treading upon it) I could not find that such a Compression, as I could conveniently give without losing Sight of its Operation, would put-out, or much injure the *Light*, even of small Fragments of *Shining Wood*. One of my *Trials* about which I find thus set down.

Differences.

I took a piece of *Shining Wood*, and having pressed it between two pieces of clear Glafs (whereof the one was pretty flat, and the other convex) so that I could clearly see the *Wood* through the Glafs, I could not perceive that the *Compression*, though it sometimes broke the *Wood* into several Fragments, did either *destroy* or considerably alter the *Light*.

2. The next *Unlikeness* to be taken notice of betwixt *Rotten-Wood* and a *kindled Coal* is, that the latter will in very few *Minutes* be totally *Extinguish'd* by the withdrawing of the *Air*; whereas a piece of *Shining Wood*, being *Eclipsed* by the absence of the *Air*, and kept so for a time, will immediately *recover* its *Light*, if the *Air* be let in upon it again within *Half an Hour* after it was first withdrawn.

The former part of this Observation is easily proved by the Experiments that have been often made upon *Quick Coals* in the *Pneumatical Engine*; and the truth of the latter part appears by the Experiments about *Shining Wood* mentioned above. Neither is it improbable, that if I had had conveniency to try it I should have found, that a piece of *Shining Wood*, deprived of its *Light* by the removal of the ambient *Air*, would retain a disposition to recover it upon the return of the *Air*, not only for *half an Hour*, but for *half a Day*, and perhaps a longer time.

3. The next *Difference* to be mentioned is, that a *live Coal* being put into a small close Glafs, will not continue to *Burn* for very many *Minutes*; but a piece of *Shining Wood* will continue to *Shine* for some whole *Days*.

The first part of the Assertion I know you will readily Grant: The other part of it may be easily made out by what I have tried upon *Shining Wood*, sealed up *Hermetically* in very small Glasses, where the *Wood* did for several *Days* retain its *Light*.

4. A 4th *Difference* may be this; That whereas a *Coal*, as it *Burns*, sends forth store of *Smoak* or *Exhalations*; *Luminous Wood* does not so.

5. A 5th *Flowing* from the former is, That whereas a *Coal* in *Shining* wastes it self at a great rate, *Shining Wood* does not.

These two *Unlikenesses* I mention together, because what concerns the *Coal* in both, will need no Proof; and as for what concerns *Rotten Wood*, it may be verified by an Observation that I made in a piece of it *Hermetically Sealed up* in a small clear Glafs, where after it had continued *Luminous* some Days, I look'd on it in the *Day* time to perceive, if any store of *Spirits* or other *Steams*, had during all that while, *exhaled* from the *Wood*, but could not find any on the inside of the Glafs, save that in one place there appeared a kind of *Dew*, consisting of such very small Drops that a Multitude of them would go to the making up of one ordinary Drop. But in pieces of *Shining Fish* I found the Case much otherwise, as was to be expected.

6. The

6. The last Differences I shall take notice of betwixt the Bodies hitherto compared is, that a *Quick Coal* is actually and vehemently hot; whereas I have not observed *Shining Wood*, to be so much as sensibly *Luke-warm*.

What is said of the *Coal's Heat*, being as manifest as its *Light*, I shall need only to make out what relates to the *Shining Wood*. To assist me wherein, I meet among my *Notes* this following.

I put upon a large piece of *Wood*, which was partly *shining*, and, as near as I could, upon one of the most *Luminous* parts of it, one of those *Thermoscopes*, that I make with a *Pendulous Drop of Water*. But as I had formerly Tryed that by laying the Tip of my Nose or Finger upon it, when it *Shone* vividly enough, to enable me to *Discern* both the one and the other at the time of a *Contact*, I could not perceive the least *Heat*, but rather an *Actual Coldness*; so by this Tryal I could not satisfy my self, that it did visibly raise the pendulous Drop, though the Instrument were so tender, that by approaching one Finger near it, yet without actually Touching of it, it would manifestly be impelled up, and upon the removal of my Finger, would presently descend again.

And I remember, that having put such an *Instrument* upon a *Shining Fish*, that was pretty large, I could not thereby perceive, that it had any degree of *Heat*, but rather the contrary: For having divers times taken off the *Glass* to apply it with the more Advantage to several parts of the *Luminous Fish*, I divers times took notice, that upon the removal of the *Glass* into the *Air*, the *Pendulous Drop* would manifestly rise a little, and subside again when the *Glass* was applied to the *Fish*. But whether this part of the Experiment will hold in all Temperatures of the *Air*, I had not opportunity to Try.

VIII. The *Great Peer* is quite Demolished and fill'd up with *Rubbish*, and the *Rocks* that lay about 40 *Tards* off in the *Sea* at the *Peer Head*, are risen above-Water; so that there is no hopes of making good that *Peer* again. And the *ways* leading from that *Peer* to the *Quarry*, are turned upside down, and sunk at several places about 30 *Foot*. Also the *way* leading to the *North Peer*, is under the same Circumstances: And the *Peer* crack'd in several Places; which *Peer* with some Charge may be Repaired. The *Earth* is slid into the *Sea* between the 2 *Peers* near 100 *Tards*, and is yet working off into the *Sea*, whereby the *Island* is damnified several *Thousand Pounds*, besides the number of poor People that depend upon their daily Labour in the *Quarry*; the Work ceasing till Reparation be made, and continues yet dreadful to behold. Which, as is conjectured, proceeded from a great Quantity of *Rubbish*, thrown over the *Cliff*, upon a *Clayish Foundation*, that by the Violence of Rain was made soft, and gave way; and not by an *Earthquake*, as some Report.

An Account of
Damage that
happened at
Portland, Feb: 2.
1692. com-
municated by Sir
Rob. Southwel.
n. 231. p. 659.

The Death of a
Dog on Firing
some Volleys of
Small shot; by
Mr. Rob. Clark.
n. 235, p. 779.

IX. In Nov. 1697. Upon Proclaiming the Peace, two Troops of Horse dismounted, were drawn in a Line in order to Fire their Volleys. The Center of their Line was against a Butcher's Door, who kept a very large Mastiff Dog, the biggest in our Town; a Dog of great Courage for Fighting. This Dog was laid by the Fire-side asleep by the Servants: But upon the first Volley the Soldiers made, he immediately started up, ran into a Chamber, and hid himself under the Bed. The Maid Servant going to beat him down, (he never using to go up Stairs) as she was about so doing a second Volley came: Which made the Dog rise, run several times about the Chamber with violent Tremblings, and strange seeming Agonies. But immediately a third Volley came: And then the Dog ran about once or twice, and fell down and Died immediately, with throwing out Blood at Mouth and Nose.

To Preserve small
Fetus's; by Mr.
R. Boyle. n. 12.
p. 199.

X. I long since presented the Royal-Society with an Experiment of Preserving Whelps taken out of the Dam's Womb, and other Fetus's, or Parts of them, in Spirit of Wine. I have also open'd Hen's Eggs at several Days after the beginning of the Incubation, and carefully taking out the Embryo's, Embalmed each of them, in a distinct Glass (which is to be carefully stop'd) in Spirit of Wine; which I did, that so I might have them in readiness, to make on them, at any time, the Observations, I thought them capable of affording. But I must not omit these 2 Circumstances; the one, that when the Chick was grown big, before I took it out of the Egg, I have, but not constantly, mingled with the Spirit of Wine, a little Spirit of Sal Armoniack, made by the help of Quick Lime: Which Spirit I chose, because, though it abounds in a Salt not Soure but Urinous, yet I never observed it (how strong soever I made it) to Coagulate Spirit of Wine. The other Circumstance is, that I usually found it convenient, to let the little Animals, I meant to Imbalm, lie for a little while in ordinary Spirit of Wine, to wash off the looser Filth, that is wont to adhere to the Chick, when taken out of the Egg; and then having put either the same kind of Spirit, or better, upon the same Bird, I suffered it to soak sometime therein that the Liquor having drawn as it were what Tincture it could, the Fetus being removed into more Pure and well Deplegmed Spirit of Wine, might not discolour it.

A Microscopical
Animal discover'd
by S. . . . n. 42.
p. 842.

XI. As we examined with an excellent Microscope some little Grains of Sand searced, we perceived an Animal with many Feet; its Back white and Scaly; but less than any of those hitherto observed: For although the Microscope shewed every Grain of Sand as big as an ordinary Nut, yet this Animal appeared no bigger than one of those Grains of Sand seen without a Microscope.

Microscopical Ob-
servations by Mr.
J. Harris. n. 220.
p. 254.

XII. Jul. 7. 1694. I examined a small Drop of Rain water, that had stood in a Gally-pott in my Window for about 2 Months. I took it (with the

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the Head of a small Pin) from the *discoloured* Surface of the *Water*, and in it I observed 4 sorts of *Animals*. In the *clear* Part of the *Drop* were two Kinds, and both very small. Some were of the Figure of *Ants-Eggs*; these were in continual Motion, and that very swift: And I find that this kind of *Oval* Figure is the most common to the *Animalcula* found in *Liquors*. The other sort that were in the *clear* Part of the *Drop*, were much more oblong; about 3 times as long as broad; these were exceeding numerous, but their Motion was *slow*, in Comparison of the former.

In the *thick* Part of the *Drop* (for the *Water* from whence I took it had contracted a *thickish* Scum) I found also two Sorts of *Animals*; as a kind of *Eels*, like those in *Vinegar*, but much smaller, and with their Extrems more sharp. These would Wriggle out into the *clear* Part, and then suddenly betake themselves back again, and hide in the *thick* and *muddy* Part of the *Drop*, much like common *Eels* in the *Water*. I saw here also an *Animal* like a large *Maggot* which would contract itself up into a *Spherical* Figure, and then stretch itself out again, the End of its *Tail* appeared with a *Forceps*, like that of an *Ear-wig*; and I could plainly see it open and shut its *Mouth*, from whence *Air-Bubbles* would frequently be discharged. Of these I could number about 4 or 5, and they seemed to be busie with their Mouths as if *feeding*.

These 4 Kinds of living *Creatures*, I found afterwards also in many other *Drops* of the same corrupted *Water* (i.e.) in its *Film* or *Scum*, which was on the Surface: For under that, in the lower Parts of the *Water*, I could never find any *Animals* at all, unless when the *Water* was disturbed, and the Surface shaken down into, and mingled with, the lower Parts.

Apr. 27, 1696, With a much better *Microscope* I examined some *Rain-Water* that stood uncovered a pretty while, but had not contracted any such *thick* and *discoloured* Scum, as that before-mentioned had. In this, where it was *clear*, I could not find any *Animals* at all: But a little thin *white* Scum, that like Grease began to appear on the Surface, I found to be a *Congeries* of exceeding small *Animalcula* of different Shapes and Sizes, much like those produced by steeping *Barly* in *Water*.

At the same Time I look'd on a small *Drop* of the *green* Surface of some *Puddle-water*, which stood in my *Yard*: This I found to be altogether compos'd of *Animals* of several Shapes and Magnitudes; but the most remarkable were those which I found gave the *Water* that *green* Colour, and were *oval* *Creatures*, whose middle Part were of a *Grass-green*, but each End *clear* and *transparent*. They would contract and dilate themselves, tumble over and over many times together, and then shoot away like *Fishes*; their *Head* was at their broadest End, for they still moved that Way. They were very numerous, but yet so large, that I could distinguish them very plainly, with a *Glass* that did not *magnify* very much. Among these were interspers'd many other smaller and *transparent* *Animals*, like those mention'd but now, as found in the *whitish* Scum that was on some *Rain-water*, which had stood a while uncovered.

Apr. 29. 1696. I found another sort of Creatures in the Water (some of which I had kept in a Window, in an open Glass); They were as Large as three of the other with the green Border about their Middles, but these were perfectly clear and colourless.

Then also examining more accurately the Belts or Girdles of Green that were about the Animals mentioned above, I found them to be composed of Globules, so like the Rows or Spawn of Fishes, that I could not but fancy they served for the same Use in these little Creatures: For I found now, since Apr. 27, many of them without any thing at all of that green Belt or Girdle; others with it very much, and that unequally, diminished, and the Water fill'd with a vast Number of small Animals, which before I saw not there, and which I now look'd on as the young animated Fry, which the old Ones had shed. I continued looking on them at times, for 2 Days, during which time the Number of the old Ones, with the green Girdles, decreased more and more; and at last I could not see one of them so encompassed, but they were all clear and colourless from End to End.

May 18. 1696, I looked on some of the Surface of Puddle-Water, which was Blewish, or rather of a changeable Colour between Blue and Red; in a very small Drop of which I found prodigious Numbers of Animals, and of various Bignesses: But among those were none with those Girdles before-mentioned, either of Green, or any other Colour.

I then also examined the Surface of some other Puddle-water, that lookt a little Greenish; and this I found stock'd with such infinite Numbers of Animals, that I never saw the like any where but in the Genitura Masculina of some Creatures. Among these there were very many of a greenish Colour; but they all moved so strangely swift, and were so near to each other, that though I tired my Eyes, I could not distinguish whether the green Colour were all over their Bodies, or whether it were only round their Middle in Girdles, as before: But from the roundness of their Figure and their Smallness, I judge that they chiefly consisted of the young animated Spawn of that kind of Animals I mentioned above. I found that the point of a Pin dip'd in Spittle would presently kill them all; as I suppose it will other Animalcula of this kind.

The same Day also I look'd on the Surface of some mineral (Chalybeate) Water, which had stood in a Vial unstopt for about 3 Weeks: In it I saw 2 kinds of Animals, one exceeding small, and the other very large: Which latter Sort had on the Tail something that look'd like Fins. There were but very few of either sort.

The Compounded Salt, or Vitriol of the Water was shot into pretty Figures, but all irregular. They look'd all like a small Heap of little Sticks, laid a cross each other at all Angles and Positions; only they were Transparent, and a little Greenish as Chrystals of a Chalybeate Nature use to be.

I infused whole Pepper Corns, Bay-berries, Oats, Barley and Wheat in Water; whose Scum, after 2 or 3 Days afforded Animals, as hath been often already found by others, at least as to some of them: But I found the greatest Numbers

Numbers and Variety in *Wheat* and *Barley Water*, and the fewest in that wherein *Bay-berries* had been steeped.

How such vast Numbers of *Animals* can be thus (as it were at pleasure) produced, without having Recourse to *Equivocal Generation*, seem a very great Difficulty to account for. But tho' the Solving of it that way makes short Work of the Matter (for 'tis easie enough to say they are bred there by *Putrefaction*) yet the asserting *Equivocal Generation*, seems to me to imply more Absurdities and Difficulties, than perhaps may appear at first Sight: I wish therefore, that this Matter would a while imploy the Thoughts of some ingenious and inquisitive Man. In the mean Time I've conjectured, that these *Animalcula* may be produced by one or both of the following Ways.

1. I have thought that the Eggs of some exceeding small *Insects*, which are very numerous, may have been laid or lodged in the *Plica* or *Ruga* of the Coats of the *Grain*, by some Kinds that inhabit on those *Seeds*, as their proper Places. For that *Insects* of the larger Kind, do frequently thus deposite their Eggs on the *Flowers* and *Leaves* of *Plants*, is often experimented; and 'tis very probable, that the smaller or *Microscopical Insects* do the same. Now these being washed out of the *Seeds*, by their Immersion in *Water*, may rise to the Surface, and there be hatch'd into those *Animals* which we see so plentifully to abound there.

2. Or the Surface of the *Water* may arrest the straggling Eggs of some *Microscopical Insects*, that perhaps were about in the *Air*, and being fitted and prepared for this Purpose, by the Infusion of proper *Grain*, or a proportionable Degree of *Heat*, may compose so proper a *Nidus* for them, that they may by the Warmth of the *Sun* be easily hatched into living *Creatures*; which its probable (like the strange *Water Insect*, from whence a *Gnat* is produced, mentioned by the learned Dr. *Hook* in his *Micrographia*, whose *Metamorphosis* I have often with Pleasure seen) may afterwards turn into *Flies* or winged *Insects* of the same *Species* with the *Animal Parent*. And perhaps sometimes both these Circumstances, and other of the like Nature, concur for their *Production*.

XIII. I have observed in *Hemisphaerules* of *Water*, duly apply'd to the End of a *Wire*, 2 sorts of *Microscopical Insects*, *Globular* and *Elliptical*.

Those of a *Globular* Form are but a little less transparent than the *Water* they swim in; they have sometimes two dark Spots Diametrically opposite, but these are rarely seen; there are sometimes two of these *Globular Insects* sticking together; where they are joyned 'tis Opacous, possibly they may be in the Act of *Generation*. They have a two-fold Motion, a swift *Progressive* irregular one, and at the same time a *Rotation* on their Axes at right Angles to the Diameter that has the dark Spots: But this is seen only when they move slowly. They are almost of an incredible *Minuteness*.

I have examined many *Transparent Fluids*, as *Water*, *Wine*, *Brandy*, *Vinegar*, *Beer*, *Spittle*, *Urine*, &c. And do not remember to have found any of them

Microscopical Animals; by Mr. Sreph. Gray. n. 221. p. 283. Vid. Vol. I Chap. III. Sect. XXVI.

them without more or less of the Bodies of these *Insects*; but I have not seen any in Motion except in *Common Water* that has stood for sometimes a longer; at others a shorter Time, as has been observ'd by M. *Leeuwenboeck*; tho' I do not remember he has observed that they are existent in the *Water*, before they revive. In the *River*, after the *Water* has been thickened by *Rain*, there are such infinite Numbers of them, that the *Water* seems in great part to owe *Opacity* and *Whiteness* to these *Globules*. *Rain-water*, so soon as it falls has many, and *Snow-water* has more, of these *Globules*. The *Dew* that stands on *Glass Windows* has them; and for as much as *Rains* and *Dews* are continually ascending, or descending, I believe we may say the *Air* is full of them; they seem to be of the same *Specifick Gravity* with the *Water* they swim in, the *Dead* remaining in all parts of the *Water*; of many *Thousands* that I have seen, I could discern no sensible Difference in their *Diameters*, they appearing of equal Bigness; in *Water* that has been *boyled*, they retain their *Shapes*, and will sometimes *revive*.

There is another sort of *Insects* I have this way seen, but these are not so frequently (at least this Winter Season) to be found; they are much longer than the former; they can transform themselves into many *Shapes*; they are for the most part *elliptical*, but sometimes they contract themselves so as to be almost *globular*; and sometimes they contract themselves so, as to be twice or three Times longer than broad, these sometimes turn themselves *round* on their *Axes* and *Diameters* as they go; they consist of *transparent* and *opacous* Parts.

Observations on
the Animalcula
in Pepper water,
&c; by Sir E. Sm.
King. n. 203.
p. 861.

XIV. Having steep'd Oats in *Rain-water*, some Days (perhaps 9 or 10.) and looking upon it with my bare Eye, I saw a Substance, that seem'd to me like that usually call'd a *Mother* (on other Liquors); and laying as much of it as a small Pin's Head upon the *Object Plate* of my best *Microscope*, I could very easily and plainly discern 7 or 8 sorts of *Animalcula*, of different *Sizes* and *Shapes* (or more) swimming in this Substance. Their *Shapes* and *Sizes* were after this manner, as near as I could guess. They were all very *Nimble* in their *Motions*, by Computation, several *Thousand Times* magnified.

Fig. 78.

2. The thin Scum upon a *Pepper-water*, that did resemble *Flakes* of *Salt* upon some sorts of humane *Urine*, applyed in the same manner to the *Object Plate* of the *Microscope*, was only Clusters of *Animalcula*, that had liquid Matter enough to swim in; and I was in *Admiration* at their Numbers, *Motions*, *Variety* and *Minuteness*.

Fig. 79.

3. In a Decoction of *Herbs*, that was strained, and set by for a particular Use; in a little of the setting of that (as much as a Pin's Head) I saw Creatures like little *Eels*, about *Thus Long*, and seem'd to be as thick, but much sharper at both Ends, with a wriggling Motion, like *Eels*.

4. I observe these small Creatures above-mentioned (if I may so call them) resemble the Nature of *Fish*, in several Respects.

First,

First, They'll Flock together, and lye close together, as if they were in *Sholes* like *Carps* in a *Pond*, that has been so shallow as I have often seen, sometimes in one place, sometimes in another, but when disturb'd, they are, as to your Sight, all disperfed and lost in a trice: And so are these little Creatures in their Original Liquor, if you shake the Liquor before you look to find them in *Sholes*, or after; At least I am sure I did, and could never find any in that parcel of Liquor, till next Day, or till they did *Associate* again.

2dly, They will follow their Liquor, to Act in, to the last Particle of it, till they have no more to *Swim* in, and then will seem to Struggle for want on't, till their Strength fails them, and then after a *Minute*, they will seem *Dead* upon the *Object Plate*, (when the watry parts are dried away.)

3dly, They will lye as if they were *Dead*, near half an *hour* or more, then put a little *Water* to them, in half a *Minute* they will begin to move themselves again, and by degrees begin to *Swim* faintly and feebly at first (as *Fish* will do,) then recovering their *Strength* again, will perform their brisk Motion as vigorous as ever.

4thly. Those that are almost *Dead* will look *Flat* as if prest thin, but when they move, Turn themselves over and over, without any Regular Motion; so that you might see them as *Thin* as the thinnest Spangle you ever saw, and like it in Shape; and they will continue so, so long as they are faint and Sick: But within about an *hour's* time they will grow Plump and well again, if you add fresh Liquor to them in time.

These *Animalcula* choose for the most part, the top of the Liquor; I suppose for the sake of the *Air*.

If you perceive them lye *Dead* upon the *Object Plate*, as I did, and do not remember to add *Water* to revive them, within an *hour*, they will be *Dead* indeed: But you may see them in the *Posture* you Left them, many *Days* after.

Now to give farther Testimony, that they are *Animalcula*, which some doubt, I have noted the following Observations.

If you take a fine Needle, and put the point into *Spirit of Vitriol*, tho' you can see none of the *Spirit* with your *bare Eye* upon its point when you take it out, yet if you prick the same point of that *Needle* into the middle of that *Drop*, no bigger than a small Pin's-head, when some *hundreds* of these *Animalcula* are *swimming* very nimbly frisking about, you shall immediately see these *Minute Creatures* (if I may so call them) presently Affected from the *Acid Particles*, so as to *Spread* themselves, and tumble down seemingly *Dead*.

Fib. 80.

If you dissolve *Salt*, and with the point of the same Needle, repeat the Experiment (in the same manner) in some of the same Liquor that contains some of the same parcel of *Animalcula*, you shall see the *Creatures* aforementioned, be Affected too, stop in their Motion, but in another manner quite, not spread flat, as those with *Spirit of Vitriol* did, but shrink long and round, in form and Figure of that we call (whole *Oatmeal*, or) an *Excorticated Oat*. And whereas the first with the *Spirit* fell down flat without turning; these, as soon as Affected, turn round and round, when they begin to be Sick, and wobble,

wobble, as we say, before they fall down to the bottom and *Die*, unless you quickly recover them with fresh Water, and then you will perceive them get a new Life by degrees.

Tincture of Salt of *Tartar* put into them in the same manner kills them more immediately, but yet they will be first so *Sick*, or so Affected, call it what you please, as you may see by a surprising *Convulsive* Motion, they will grow faint and Languid apace; as you may see them fall to the Bottom of the *Drop* upon your Object Plate *Dead*, but in their own Shape as they were before you applied your Needle, and will neither be *Flat* as with *Spirit* of *Vitriol*; nor *Cylindrical* as with common Salt Liquor.

Ink kills them as soon as *Spirit* of *Vitriol* but makes them seem to shrink divers ways; I suppose by the *Solution* of *Copper* which is in its Composition,

Blood (newly prest from a prick purposely made in your Finger) kills them almost as soon as *Spirit* of *Vitriol*; by reason, (I suppose) of the Salt therein: But it's a fine and surprising Sight, to observe them swimming and bustling, first among the *Globules* of the *Blood* Justling one another, like *Fish* that are suddenly deprived of *Water*, and bustle together amongst *Mud*; for so they appeared to me.

Urine kills them too, in a little time, tho' not so soon.

Sugar dissolved like Salt kills them also, if used in the same manner, and with that some die *Flat*, and some die *Round*.

Sack will kill them, but not so speedily as the other Liquors.

*Miscellaneous
Experiments, by
Sir Rob. South-
well
n. 238. p. 87.*

XV. For Red, *Tinctura Rosarum* 6 Spoonfulls.

For a higher Red, *Syrupus Florum Punicorum*, One Spoonfull; either of these to be Mixed with 5 of ordinary *Water*.

For *Violet*, one Spoonful of *Syrub* of *Violets* to 5 Spoonfuls of *Water*.

Then to Change the *Rose* Colour into high *Green*, R *Oleum Tartari per deliquium*, wash herewith the inside of the *Glass*, leaving a few Drops at the bottom, and then pour in the said *Rose Tincture*, and it will change.

To make the high *Red* *Black*; dissolve half the bigness of a Walnut of *Sal Armoniack* in a glass of *Water*, pour all out but 3 or 4 Drops in the Bottom, if the said *Red* be put hereinto, it turns as *Black* as *Ink*.

To make the *Violet* *Red*; wash the glass with the *Spirit* of *Vitriol* in manner aforesaid, and pour therein your *Violet* *Water*.

To make *Red Wine* *Tellow* as *Sack*; steep in white *Wine* *Erazil* wood 24 *Hours*, or else in ordinary *Water*, till it looketh *Red*, and pour the same into a glass washed with *Vinegar*, it grows presently *Tellow*.

To make this *Tellow* *white*; R *Styrax Calamita* and *Benjamin* half an Ounce of each, Pulverize it and steep it in 4 Ounces of *Aqua Vita*, of which a few Drops will turn the Liquor *white*.

Note; This maketh the *Lac Virginis* for the common *Wash*.

Washing with clear *Water*, to make the Hands and Face *Black*.

Beat *Galls* into very fine Powder, and strew it very well and rowl it up and down into a *Towel*, then into a *Bason* of *Water* throw some *Roman Vitriol*.

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Vitriol, which will soon dissolve; and after the Party hath washed therein, it being *clear* and without smell, as soon as they wipe with the Towel, all the *Skin* grows *Black*. And in some Days, washing it with *Soap*, it will come off.

To renew the *Lustre* of *Chrystal*; Boil your *Chrystal* in fair Water, for a *Quarter* of an *Hour*, and to a Proportion of 6 *Quarts* of Water, and one *Quart* of *Brandy Wine*, letting the same continue to boil half an *Hour* more; then take it out, and with the same Liquor rub it all over throughout with a *Brush*; and then dry it with a clean warm *Napkin*, rubbing it in every part, and it will regain its former *Lustre*.

To make the *Hair* grow; Take the *Root* of *Bur-dock*, or what they call *Cuckolds-Burs*, which stick on the Cloaths, of the largest Size, in *December*; boyl them in *French white Wine* 8 Fingers high, till half be consumed: wash the *Head* herewith, being warmed at Night, and it makes the *Hair* come out, in case the *Roots* be good.

Another; Make a *Lye* of the *Ashes* of *Vines*, and wash the *Head* therewith, being warm.

To hinder the *Hair* from falling; put *Vine-Ashes* in *red Wine* of *France*, and then filter all, and with that Liquor wash the *Head* warm.

Memorandum; the Powder of *Hermoadiles* used in the *Hair*, as common Powder, does the same thing.

Pour faire du *Feu Bleu*; Faites vous faire de *Mesches* aupres d'un *Cordier*, qui ne soit pas trop fortement Tordues. Fondez du *Soulfre* dans un pot à *Feu* de *Charbons*, trempez les *Mesches* dedans Trois ou Quatre fois selon que vous les aimerez d'avoir Grosse. Pour en représenter donc une *Figure*, on l'ébauche sur des *Planches*, puis on y Attache en suivant ces Traces les *mesches* avec des *Cloux*, & les rend un peu Rabboteuses en les battant avec un *Marteau*, a fin que la matiere suivante y tienne tant mieux. Cela fait, prenez de l' *Eau de Vie* forte, Meslez y de la *Poudre à Canon* en *Farine*. tant que tout soit en Consistence d'une bouill & frottez en les *Mesches* avec un *Pinceau*, & espardez encore dessus de la *Poudre* en *Farine*. Ainsi on laisse le tout Secher, & il sera Preparé à l' Usage.

XVI. Take of small thin *Copper* pieces, clean'd in the Fire 3j. of *Aqua Fortis* 3iij. which being put together in a glass, the *Copper* in 3 or 4 Hours will be dissolved; When 'tis Cold you may use it, by washing with a Feather upon your *Iron*, that is made clean and smooth, and it will presently take the Colour of *Copper*; when it cometh out with rubbing, you may renew it again, but if you do it twice together, the *Iron* will look *Black*.

To give Iron a
Copper Colour by
S. R. Robert
Southwell.
n. 24. p. 279.

XVII. Beat a *Ducket* thin, and dissolve it in two Ounces of *Aqua Regia*, then dip therein a clean *Rag*, and let the same dry, and do it again and again till all the said Liquor be soaked up; then burn the said *Rag*, and with the *Tinder* there of let *Silver* be rub'd, using therewith a little *Spittle*.

To Gild Gold
upon Silver by
S. R. Southwell.
n. 23. p. 298.

and if by Chance the *Silver* will not take, then hold it to the Fire to take away all manner of Grease, and it will not fail.

Memorandum; This Method is known to very few Goldsmiths in Germany.

To Print Glass in
Marble Colours;
by Sir Robert
Southwell.
n. 245. p. 364.

XVIII. 1. Grind well upon a Stone some *Minium* for Red.

2. *Radix Curcumæ*, or rather *Cerussa Citrina* for Yellow.

3. *Smalt* for Blue.

4. *Verdegrease* for Green.

5. *Cerusse*, or Chalk for White.

Which being all separately wrought in Oyl, take a brush of Hog's Hair dipt in any of the said Colours, and it will, being rowled in your Hand, scatter the same upon the Glass; then with your Pencil Work them together as you think fit; and lastly, fling a little Mead amongst them, which covers all.

An Imitation of
China Dishes; by
..... n. 7.
p. 127.

The Chinese way
of making Gold
Thread; by Dr.
Hans Sloan.
n. 250. p. 71.

XIX. S. *Septalio*, a Canon in Milan, hath the secret of making as good Porcelane as is made in China it self, and Transparent.

XX. The Chinese guild Paper on one side with Leaf Gold, then cut it in long Pieces; they then Weave it into their Silks, which makes them, with little or no cost, look very Rich and Fine. The same long pieces are twisted or turn'd, about Silk Thread by them, so Artificially, as to look finer than Gold Thread tho' it be of no great Value.

To Counterfeit
Opals, by Mr. S.
Colepeffe.
n. 28. p. 743.

XXI. I have been two Days at Harlem on purpose to see the Experiment of the making of Counterfeited Opal-Glass; It is very lively, I confess, and as I guess performed only by the degrees of Heat, producing the Colours. When the Composition is thoroughly Melted, they take out some on the Point of an Iron-rod, which being cool'd either in the Air or in Water, is colourless and pellucid, but being put into the Mouth of the Furnace on the same rod, and there turned by the hand for a little space, hath its little Bodies so variously posited in several parts of the same piece, as that the Light falling on them, being variously Modified thereby, Represents those several Colours that are seen in the True Opal. Whether it be the greatest, or least degree of Heat, that renders it a White Opaque Body, I have let slip; but this I know, (which seems remarkable) that the Colours of it may be destroy'd and restored according to the various Motions (I suppose) of its Particles by Heat.

Some Observa-
tions touching Co-
lours & Dyes;
by Dr. M. Lister.
n. 80. p. 2182.

XXII. Two things, I conceive are chiefly aimed at in the Inquiry of Colours; the one, to encrease the *Materia Tinctoria*, and the other, to fix, if possible, those Colours we either have already, or shall hereafter discover, for use. As to the first, Animals and Vegetables, besides other Natural Bodies, may abundantly furnish us; and in both these kinds some Colours, are Apparent, as the various Colours of Flowers, and the Juices of Fruits,

&c. and

&c. and the *Sanies* of *Animals*; others are *latent*, and discovered to us by the Effects the several Families of *Salt*, and other things, may have upon them. Concerning the apparent Colours of *Vegetables* and *Animals*, and the various Effects of different *Salts* in changing them from one Colour to another, we may have many Instances in *Mr. Boyle*. And if we might, with the good Leave of that honourable and learned Person, range them after our Fashion, we should give you at least a new Prospect of them, and observe to you the Conformity and Agreement of the Effects of *Salt* on the divers Parts of *Vegetables*, viz.

1. That *acid Salts* advance the Colours of *Flowers* and *Berries*; that is, according to the Experiments of *Mr. Boyle*, they make the Infusions of *Balaustium* or *Pomegranat-Flowers*, *Red-Roses*, *Clove-jilly-Flowers*, *Meserion*, *Pease-bloom*, *Violets*, *Cyanus-Flowers*, of a fairer Red; also the Juices of the *Berries* of *Ligustrum*, of *Black Cherries*, *Buck-thorn-Berries* of a much fairer Red; and to the same Purpose *acid Salts* make no great Alterations upon the white *Flowers* of *Jasmin* and *Snow-drops*. 2. That *urinous Salts*, and *Alcaly's*, on the contrary, quite alter and change the Colours of the same *Flowers* now named, and the Juices of the said *Berries* also from Red to Green; even *Jasmin* and *Snow Drops*. 3. Again, that in like manner *urinous Spirits* and *Alcaly's* advance, at least do not quite spoil the Colours of the Juices of *Leaves* of *Vegetables*, of their *Wood* and *Root*. Thus *Mr. Boyle* tell us that *urinous Spirits* and *Alcaly's* make the yellow Infusions of *Madder-Roots*, Red; of *Brazil-wood*, Purplish; of *Lignum Nephriticum*, Blue; the red Infusion of *Log-wood*, Purple; of the *Leaves* of *Sena*, Red. 4. That on the contrary, *acid Salts* quite alter and change the said Infusions from Red or Blew, to Yellow.

In the next Place we would note to you the Effects of *Salts* upon *Animals*, in the Production and Change of Colours: But the Instances are very few or none, that I meet with in any Author; the *Purple Fish* being quite out of Use; and *Cochineil* and *Kermes* are by most questioned, whether they are *Animals* or no; but I think, we may confidently believe them both to be *Insects*, that is, *Worms* or *Chrysalys's* of respective *Flyes* in *proxima Fætura*. We find then, and have tried concerning *Cochineil* (which of itself is Red,) that upon the Affusion of the Oyl of *Vitriol*, that is an *acid Salt*, it strikes the most vivid *Crimson* that can be imagined; and with *urinous Salts* and *Alcaly's*, it will be again changed into an obscure Colour 'twixt a *Violet* and a *Purple*.

Concerning the apparent Colours in *Flowers*, we think we may assert; 1. That generally all Red, Blue and White *Flowers* are immediately, upon the Affusion of an *Alcaly*, changed into a Green Colour, and then in process of no long time, turned Yellow. 2. That all the Parts of *Vegetables*, which are Green, will in like manner strike a Yellow with an *Alcaly*. 3. That what *Flowers* are already Yellow, are not much changed, if at all, by an *Alcaly* or *urinous Spirit*. 4. The blue *Seed-Husks* of *Glaſtum Sylvestre* old gathered and dry diluted with Water, stain a Blue, which upon the Affusion of *Lye* strikes a Green; which Green or Blue being thus touched

with the Oyl of *Vitriol* dyes a *Purple*. All these 3 Colours stand. 5. On the Tops of *Muscus Tubulosus*, so call'd by Mr. Ray in his late *Catalogue* of the *Plants of England*, are certain *red Knots*; these, upon the Affusion of *Lye*, will strike a *Purple*, and stand.

As for the *Latent Colours* in *Vegetables* and *Animals*, to be discovered to us by the Affusion of *Salts*; they likewise, no Doubt, are very many. We will set down only a few Instances in both Kinds, which have not been, that we know of, discovered or taken Notice of by others. 1. *Latent Vegetable Colours*. 1. The *Milky Juice* of *Lactuca Sylvestris costà Spinosa*, and *Sonchus Asper* and *Levis*, upon the Affusion of *Lye*, will strike a Vivid *Flame-Colour*, or *Crimson*, and after some time quite degenerate into a dirty *Tellow*. 2. The *Milk* of *Cataputia Minor*, upon the Affusion of *Lye*, especially if it be drawn with a Knife, and hath any time stood upon the Blade of it, will strike a *Purple* or *Blood-Red-Colour*, and by and by change into an ignoble *Tellow*. 2. *Latent Animal Dyes*. 1. The common *Hawthorn-Caterpillar* will strike a *Purple*, or *Carnation*, with *Lye*, and stand. 2. The Heads of *Beetles* and *Pismires*, &c. will with *Lye* strike the same *Carnation-colour* and stand. 3. The *Amber-coloured Scolopendra* will give with a *Lye* a most beautiful and pleasant *Azure* or *Ametbyline*, and stand.

Lastly, we might consider the *fixing* of Colours for use; but we are willing to leave this to more experienced Persons. Some obvious Inferences however we may venture to take Notice of. 1. That in all the Instances above-mentioned, whether *Vegetable* or *Animal*, there is not one Colour truly fixed; I say, truly fixed, that is, Proof of Salt and Fire: For, what seems to stand and be *Lye-Proof*, are either wholly destroyed by a different Salt, or changed into a much different Colour; which must needs prove a *Stain* and *Blemish*, when it shall happen in the Use of any of them. 2. That both the *Apparent* and *Latent Colours* of *Vegetables* are fixable: An Instance whereof we may observe in the *Seed-husks* of *Glassum*; and the Use *Dyers* make of the *Leaves* after due Preparation. 3. It is probable from the same Instance, that we may learn from the Colour of some part of the *Fruit* or *Seed*, what Colour the *Leaves* of any *Vegetable* and the whole *Plant* might be made to yield for our Use. 4. That the *Latent Colours* of *Vegetables* are *Præ-existent*, and not produced; from the same Instance of *Woad*, and likewise from this, that the *Milky Juice* of *Lactuca Sylvestris* doth afford it self a *red-Serum*. 5. That the *Change of Colours* in *Flowers* is gradual and constant. 6. That the Colours of *Flowers*, which will not stand with *Lye*, seem to be wholly destroyed by it, and irrecoverable. Thus it happens in the Experiment, that one part of a *Violet Leaf*, upon the Affusion of *Lye*, is changed very soon into *Tellow*, and will never be revived into a *Red* by any *acid Salt*; but if another part of the same *Leaf* be still *Green*, it will be revived. 7. That the *Dryness* seems to be a Means, if not of *Fixing*, yet bringing the *Vegetable Colour* into a Condition of not wholly and suddenly perishing by the otherwise destroying *Alcaly*. 8. That those *Plants* or *Animals* that will strike different and yet

yet vivid Colours upon the Affusion of *different Salts*, and stand, as the *Cochinell* and *Glaſtum*, are probably of all others to be reckoned as the best Materials.

XXIII. The *Pelt* being taken off is first ſtreined by Lines on a ſort of Rack to dry them. And the *Brains* of the *Deer* is taken out and meſſed and dawbed on Moſs or dried Graſs, and then dried in the Sun, or by a Fire to preſerve them.

The Weſt-Indian Way of Drefſing Buck and Doe Skins; by Sir Rob. Southwell. n. 194. p. 532.

When the *Hunting-Time* is over, the *Women* (for the *Men* never do it) *drefs* the *Skins*; firſt, by putting them in a Pond, or Hole of Water, to *ſoak* them well; then with an old Knife fixt in a cleft Stick, they force off the *Hair* whilſt they remain wet. The *Skins* being thus prepared, they put them and a Proportion of the *dried Brains* into a Kettle over a Fire, till they are more than *Blood-warm*; which will make them *ladder* and ſcour perfectly Clean; which done, they with ſmall Sticks wreſt and twiſt each *Skin* as long as they find any *Wet* to drop from them, letting them remain ſo wreſted ſome *Hours*; and then they untwiſt each *Skin*, and put them into a ſort of a Rack, like a *Clothier's Rack*, (which they fix at every Place they come to, with no more Trouble than two ſmall Poles ſet up-right, and two more put athwart, all fixed with their own *Barks*;) and extend them every way by Lines, and as the *Skin* dries, ſo they with a dull *Hatchet*, or a *Stick* flattend and brought to a round Edge, or a *Stone* fitted by Nature for that Purpoſe, rub them all over, to force all the Water and *Greafe* out of them, till they become perfectly *dry*. This is all they do: And one *Woman* will *drefs* 8 or 10 *Skins* in a *Day*; that is, begin and end them.

XXIV. 'Tis a conſiderable Advantage which thoſe have who want their *Eye-ſight*, as to *Memory*, and the Application thereof: For we who have our *Eye-ſight* can with more Advantage apply our *Memory* (in Matters of intent Conſideration) by *Night*, in the *Dark*, when all Things are quiet, than by *Day*, when *Sights* and *Noiſe*, are apt to divert our Thoughts; and even by *Day* we may better do it with our *Eyes ſhut*, than *open*.

The Strength of Memory; by Dr. Wallis. n. 178. p. 1269.

I had the Curioſity many *Tears* ago to try how far the *Strength* of *Memory* would ſuffice me to perform ſome *Arithmetical Operations* (as *Multipli- cation*, *Diviſion*, *Extraction of Roots*, &c.) without the Aſſiſtance of *Pen* and *Ink*, or ought equivalent thereto: And I found it to ſucceed in Numbers of 20, 30, or 40, *Places*. Particularly Dec. 22. 1669. (by *Night* in the *Dark*) I extracted the *Square Root* of 3, to the 20th Place of *decimal Fractions*. And at the Requeſt of a *Foreigner*, Feb. 18. 1672. (by *Night* in *Bed*, and without any other Aſſiſtance than my *Memory*) I propoſed to my ſelf a Number of 53 *Places*, and found its *Square Root* to 27 *Places*: And (having fixt them in my *Memory*, by repeating the ſame Operation a *Night* or two after) at his next Viſit, Mar. 11. following, I dictated to him the *Numbers* from my *Memory*, not having committed them to *Writing* before.

By

By which I am sufficiently satisfied that a reasonable good *Memory*, fixt with good *Attention*, is capable of being charged, with more, than a Man would at first imagine.

The Credibility
of Humane Testi-
mony; by . . .
n. 356, p. 359.

XXV. *Moral Certitude Absolute*, is that in which the Mind of Man entirely acquiesces, requiring no further Assurance. As if one, in whom I *Absolutely confide*, shall bring me Word of 1200 l. accruing to me by Gift or a Ship's Arrival; and for which therefore I would not give the least valuable Consideration to be ensured.

Moral Certitude incompleat, has its several Degrees to be estimated by the Proportion it bears to the *Absolute*. As if one, in whom I have that Degree of Confidence, as that I would not give above one in 6 to be ensured of the Truth of what he says, shall inform me, as above, concerning 1200 l. I may then Reckon that I have as good as the *Absolute*, Certainty of 1000 l. or five Sixths of *Absolute Certainty* for the whole Sum.

The Credibility of any Reporter is to be rated, 1. by his Integrity, or Fidelity; and 2. by his Ability. And a double Ability is to be consider'd; both that of Apprehending what is delivered, and also of Retaining it afterwards, till it be transmitted.

What follows concerning the Degrees of Credibility, is divided into 4 Propositions. The two first respect the Reporters of the Narrative, as they either transmit successively, or attest concurrently: The 3d the Subject of it; as it may consist of several Articles; and the 4th joyns those 3 Considerations together, exemplifying them in Oral and in written Tradition.

Prop. I. Concerning the Credibility of a Report, made by single successive Reporters, who are equally credible.

Let their Reports have each of them, Five Sixths of Certainty; and let the first Reporter give me a Certainty of 1000 l. in 1200 l. It is plain that the second Reporter, who delivers that Report, will give me the Certainty but of $\frac{1}{2}$ of that 1000 l. or the $\frac{1}{2}$ of $\frac{1}{2}$ of the full Certainty for the whole 1200 l. And so a 3d Reporter, who has it from the 2d will transmit to me $\frac{1}{2}$ of that Degree of Certainty, the 2d would have delivered me; &c.

That is, if a be put for the Share of Assurance a single Reporter gives me; and c for that which is wanting to make that Assurance compleat;

and I therefore supposed to have $\frac{a}{a+c}$ of Certainty from the first Reporter;

I shall have from the Second, $\frac{a^2}{a^2+c^2}$ from the 3d, $\frac{a^3}{a^3+c^3}$ &c. And

accordingly if a be = 100. and c = 6. (the Number of Pounds that an 100 l. put out to Interest brings at the Year's End) and consequently my Share of Certainty from one Reporter, be = $\frac{1}{1.06}$ (which is the present Value of any Sum to be paid one Year hence) the Proportion of Certainty coming

ming to me from a 2d. will be $\frac{1}{10}$ multiplied by $\frac{1}{10}$, (which is the present Value of Money to be paid after two Years,) and that from a 3d Hand reporter $= \frac{1}{100}$, thrice multiplied into its self; (the Value of Money payable at the end of 3 Years,) &c.

Corollary. And therefore, as at the rate of 6 per Cent. Interest the Present Value of any Sum Payable after 12 Years, is but half the Sum: So if the Probability or Proportion of Certitude transmitted by each Reporter be $\frac{1}{10}$, the Proportion of Certainty after 12 such Transmissions, will be but as a half; and it will grow by that time an equal Lay, whether the report be True or no. In the same manner, if the Proportion of Certainty be set at $\frac{1}{100}$, it will come to a half from the 70th Hand: And if at $\frac{1}{1000}$, from the 695th.

Prop. II. Concerning concurrent Testifications.

If Two concurrent Reporters have, each of them, as $\frac{1}{2}$ of Certainty, they will both give me Assurance of $\frac{3}{4}$, or of 35 to one; if three, an Assurance of $\frac{7}{8}$, or of 215 to one.

For if one of them gives a Certainty for 1200 l. as $\frac{1}{2}$ there remains but an Assurance of $\frac{1}{2}$, or of 200 l. wanting to me, for the Whole. And towards that the 2d Attester contributes, according to his Proportion of Credibility, That is, to $\frac{1}{2}$, of Certainty before hand, he adds $\frac{1}{2}$ of the $\frac{1}{2}$, which was wanting. So that there is now wanting but $\frac{1}{4}$ of $\frac{1}{2}$; that is, $\frac{1}{8}$; and consequently I have, from them both, $\frac{7}{8}$, of Certainty. So from Three, $\frac{217}{218}$, &c.

That is, if the first Witness gives me $\frac{a}{a+c}$ of Certainty, and there is wanting of it $\frac{c}{a+c}$; the Second Attester will add $\frac{a}{a+c}$ of that $\frac{c}{a+c}$. And consequently leave nothing but $\frac{c}{a+c}$ of that $\frac{c}{a+c}$. And in like manner the 3d Attester adds his $\frac{a}{a+c}$ of that $\frac{c}{a+c}$, and leaves wanting only $\frac{c^3}{(a+c)^3}$. &c.

Corollary. Hence it follows, that if a single Witness should be only so far Credible, as to give me the half of a full Certainty; a Second of the same Credibility, would (joyned with the First) give me $\frac{3}{4}$, a Third $\frac{7}{8}$, &c. So that the Coattestation of a Truth, would give me $\frac{1023}{1024}$ of Certainty; and the Coattestation of a Twentieth, $\frac{10396875}{10396876}$, or above two Millions to one. &c.

Prop. III. Concerning the Credit of a Reporter for a Particular Article of that Narrative for the Whole of which he is Credible in a certain Degree. Let

Let there be Six Particulars of a Narrative equally remarkable. If he to whom the Report is given, has $\frac{1}{2}$ of Certainty for the whole Sum of them, he has 35 to one against the Failure in any one certain Particular.

For he has 5 to one, there will be no Failure at all: And if there be, he has yet another 5 to one, that it falls not upon that single Particular of the Six: That is, he has $\frac{1}{2}$ of Certainty for the whole, and of the $\frac{1}{2}$ wanting he has likewise $\frac{1}{2}$, or $\frac{1}{4}$, of the whole, more; and therefore that there will be no Failure in that single Particular, he has $\frac{1}{2}$ and $\frac{1}{4}$ of Certainty; or $\frac{3}{4}$ of it.

In general if $\frac{a}{a+c}$ be the Proportion of Certainty for the whole, and

$\frac{m}{m+n}$ be the Chance of the rest of the Particular Articles m , against some One or more of them n , there will be nothing wanting to an Absolute Certitude, against the not failing in the Article or Articles n , but only

$$\frac{n}{m+n} \times \frac{c}{a+c}$$

Prop. IV. Concerning the Truth of either Oral or written Tradition, (in whole, or in Part,) Successively Transmitted, and also Coattested by several Successions of Transmittents.

1. Supposing the Transmission of an Oral Narrative to be so performed by a Succession of Single Men, or Joyned in Companies, as that each Transmission, after the Narrative has been kept for 20 Years, impairs the Credit of it a 12th part; and that consequently in the 12th Hand, or at the end of 240 Years, its Certainty is reduced to a half; and there grows then and even Lay (by the Corollary of the 2d Proposition) against the Truth of the Relation: Yet if we further suppose, that the same Relation is Coattested by 9 other several Successions, Transmitting alike each of them, the Credibility of it when they are all found to agree, will (by the Corollary of the first Proposition) be as $\frac{1023}{1024}$ of Certainty, or above a Thousand to one; and if we suppose a Coattestation of 19, the Credibility of it will be as above 2 Millions to one.

2. In Oral Tradition, as a Single Man is Subject to much Casualty, so a Company of Men cannot be so easily supposed to Joyn; and therefore the Credibility of $\frac{1023}{1024}$ or about $\frac{1}{2}$ may possibly be Judg'd too high a Degree for an Oral Conveyance, to the distance of 20 Years. But in Written Tradition, the Chances against the Truth or Conservation of a single Writing are far less: and several Copies may also be easily supposed to concur, and those since the Invention of Printing exactly the same; several also distinct Successions of such Copies, may be as well supposed, taken by Different Hands, and preserv'd in different Places or Languages.

And

And therefore if *Oral Tradition* by any one Man or Company of Men might be supposed to be *Credible* after 20 Years, at $\frac{1}{10}$ of Certainty, or but $\frac{1}{15}$ or $\frac{1}{20}$, a *Written Tradition* may be well imagined to continue, by the *Joynt Copies* that may be taken of it for one place, (like the several *Copies* of the same *Impression*) during the space of 100, if not 200 Years; and to be then *Credible* at $\frac{1}{10}$ of Certainty, or at the Proportion of 100 to 1. And then seeing that the *Successive Transmissions* of that $\frac{1}{10}$ of Certainty, will not diminish it to a half until it passes the 69th Hand, (for it will be near 70 Years before the rebate of Money, at that Interest, will sink it to half,) It is plain, that *Written Tradition*, if preserved but by a *Single Succession* of Copies, will not lose half of its full Certainty, until 70 times 100, if not 200 Years are past; that is 7000, if not 14000 Years. And further, that, if it be likewise preserved by *concurrent Successions* of such Copies, its *Credibility* at that distance may be even *Increased*, and grow far more certain from the several agreeing deliveries at the end of 70 Successions, than it would be at the very First from either of the *Single Hands*.

3. Lastly, in stating the Proportions of *Credibility* for any Part or Parts of a Copy, it may be observed, that in an *Original*, not very long, good odds may be laid, that a Copy by a careful Hand shall not have so much as a *Literal Fault*: But in one of greater Length, that there may be greater odds against any *Material Error*, and such as shall alter the *Sense*; greater yet, that the *Sense* shall not be altered in any considerable Point; and still greater, if there be many of these Points, that the *Error* lights not upon such a *Single Article*, as in the third Proposition.

XXVI. At London in the Year 1685. there were

Christen'd; Males, 7484. Females, 7246. in all, 14730.

Bury'd; Males, 11891. Females, 11331. in all, 23222.

An. 1686. Christen'd; Males, 7575. Females, 7119. in all, 14694.

Bury'd; Males, 11828. Females, 10781. in all, 22609.

An. 1687. Christen'd; Males, 7737. Females, 7213. in all, 14950.

Bury'd; Males, 11174. Females, 10285. in all, 21459.

General Bills of
Mortality in
London, n. 177.
p. 1245.

n. 191. p. 445

		Good	Poor	Wast	Total
Jan. 1691	Houses—	4665	485	849	5999
1697		4905	502	717	6124
Jan. 1691	Hearths---	24402	1080	3439	29220
1697		25366	1227	2027	29519

XXVII.

The Number of
the Houses and
Hearths in Dub-
lin by Capt.
South. n. 261.
p. 518.

In the Total of *Hearths*, there are included 299 which are in *Colleges*, &c. and are not reckoned in the 3 first Columns.

XXVIII.

The Number of
People in Ireland
An 1695 by Capt.
South. n. 261,
p. 520.

County of <i>Ardmagh</i>	Persons Assessed	25185	
	Persons Exempted	455	23640
County of <i>Louth</i>	Persons Assessed	16502	
	Persons Exempted	701	17203
County of <i>Meath</i>	Persons Assessed	42181	
	Persons Exempted	1138	43319
In the rest of the Kingdom, according to the first Quarter's Assessment of the Poll, there are, in Proportion to the above 3 Counties, which were very exactly returned.			86162
			40508
			907432
Total			1034102

XXIX.

A List of the Sea-
faring People in
Ireland, An.
1697. by Capt.
South n. 261.
p. 591.

	Sea- men	Fisher- men	Boat- men	Total	Whereof Papists
<i>Baltimore and Members</i>	9	188	84	281	268
<i>Belfast, &c. Carrickfergus Included</i>	194	62	12	268	2
<i>Coleraine</i>	48	233	169	450	209
<i>Cork</i>	58	34	91	183	111
<i>Donoghade, whereof Masters 35.</i>	283	28	2	313	
<i>Drogheda</i>	22	56		78	61
<i>Dublin</i>	42	271	99	412	276
<i>Dundalk and Carlingford</i>	2	90		92	51
<i>Gallway</i>	42	42	88	172	140
<i>Killebeggs</i>	5	120	4	129	78
<i>Kinsale</i>	104	76	45	225	106
<i>Limerick</i>	13		37	150	132
<i>Londonderry</i>	56	46	122	124	36
<i>Rosfe</i>	20	85	77	182	148
<i>Sligo</i>	11	68	8	87	60
<i>Strangford</i>	69	159	12	240	78
<i>Tralee and Kerry</i>	2	165		167	163
<i>Waterford</i>	36	83	50	169	143
<i>Wexford</i>	80	346		426	399
<i>Wicklow</i>	22	49	5	76	58
<i>Toughball</i>	40	114	46	200	135
Total	1158	2315	951	4424	2654

(667)

Counties.	Regulars	Seculars	Counties.	Regulars	Seculars
Cavan	5	29	Kildare	9	16
Fermanagh	6	13	Lowth	12	14
Donegal	22	24	Carlow	8	8
Tyrone	7	22	Kilkenny	17	30
Downe	4	15	King's County	13	19
Antrim	5	13	Queen's County	1	16
Ardmagh	4	10	West-Meath	16	22
Monaghan	5	20	Lungford	15	22
Waterford	16	23	Roscommon	24	52
Limerick	15	51	Leitrim	13	20
Clare	18	43	Sligo	31	31
Cork	30	97	Mayoe	42	50
Kerry	19	23	Gallway	39	45
Tipperary	48	39	Meath	19	23
Londonderry	5	15	Dublin	1	26
Wicklow	6	15	Drogheda Town	4	2
Wexford	16	24			
			Total		

495 | 872

Shipt for Foreign Parts, by Act of Parliament, the Number of Regulars following, their Passage and Provisions being paid for by the Government: (viz.)

From Dublin	153
Gallway	170
Cork	75
Waterford	26
Total	

424

A. 1695.	Marry'd	Christen'd	Bury'd	Marry'd	Christen'd	Bury'd
January.	23	79	72	July.	21	69
February.	17	67	76	August.	28	78
March.	00	65	62	September.	15	73
April.	35	78	58	October.	31	86
May.	25	89	77	November.	25	69
June.	20	75	74	December.	08	88
			Sum	248	916	748

XXXI.

Bills of Marriages, Births, and Burials, in Frankfort as the Maine; by Dr. Fred. Slare, n. 299. p. 559.

So that there were Married 248 Couples; and amongst them 2 Couples that lived before, 50 Years in Matrimony.

Frankfort; Citizens Children, 534. Foreigners, 234. Males, 420. Females, 348. in all, 768. And amongst them Twins 11. Posthumous, 11. Fetters, 2. Bastards, 13.

Sachsenhausen; Citizens Children, 94. Foreigners, 54. Males, 84. Females, 64. in all, 148. And amongst them Twins, 3. Posthumous, 1. Bastards, 2.

Christen'd in all, 916.

Frankfort; Citizens, 63. Women, 39. Widows, 24. Sons, 153. Daughters, 123. Not Christen'd, 7. Foreigners, 194. Out of the Hospital, 30. Out of the Alms, Orphans, and Work-Houses, 9. in all, 642.

Sachsenhausen; Citizens, 8. Women, 3. Widows, 3. Sons, 20. Daughters, 14. Not Christen'd, 3. Foreigners, 55. in all, 160.

Deceased in all, 748.

Q q q q 2

XXXII.

XXXII. Marriages, Births and Burials, in Old, Middle, and Lower Marck: n. 260. p. 471.

In the Year 1698.	Mar- ried.	Christ- ned.	Bas- tards	Bury'd	In the Year 1698.	Mar- ried.	Christ- ned.	Bas- tards	Bury'd
In Thurfurft, Schloband Dobru-Kirchen.	63	117		69	Straukbergische Insp.	22	93		44
In Berlin	88	332	9	200	Zebdenische Insp.	40	148		88
In Berlinischen Inspec.	185	717	26	469	Ravensche Inspec.	142	303		67
In Berlin Suburbs	36	143	14	136	Reu-Angermundische Inspec.	202	362	9	154
In Collen	62	188	4	98	Lenkensche Inspec.	51	220		127
In Collenischen Inspec.	58	263	4	88	Rathenowische Insp.	92	381		180
In Collenischen Suburbs	11	87	8	17	Wrikenische Inspec.	52	193		110
In Frederichswesder	22	103	4	51	Treven Brienische In- spec.	34	127		52
In Dorotheen-Stadt	26	100		36	Beelische Inspec.	28	93		57
In Frederich-Stadt	38	146	12	37	Beeklowische Insp.	50	206		87
Of the Guarnison					Mittenwaldische Insp.	23	84		48
Die Frankoff. Gemeinde in beiffgen Thurf. Re- sidenten Statden	57	259		138	Lindowische Inspec.	16	96	1	42
Allestadt Brandenb. Inf.					Eurstenwaldische Insp.	26	95	4	42
Reustadt Brandenb. In- spec.	99	388		166	Reustadt Eberkwaldif- che Inspec.	22	118	6	51
Stift Brandenb. Insp.	56	235		129	Manchebergische Insp.	64	236		121
Frankfurische Inspec.	243	872		438	Stendalische Inspec.	95	226		186
Reformirte Gemeinde zu Frankfurt an der Oder					Altstadt Galkwedelsche Inspec.	142	521	25	320
Perlebergische Inspec.	92	375		226	Roustadt Galkwedel	12	56	4	45
Reuen Ruppinsche Inf.	82	230		171	Pailsche Inspec.	49	188		94
Wittstockische Inspec.	46	211		111	Gardelegensche Insp.	94	393	2	232
Havelbergische Inspec.	30	154		86	Geebauensche Inf.	109	321		260
Im Dokm zu Havelberg	16	93		55	Ayrische Inspec.	39	144		82
Prikwaldische Inspec.	82	314		163	Apenburgische Insp.				
Spandowische Inspec.	94	364		170	Tangermundische Insp.	71	330		132
Reform. Gemeinde zu Spandow.	4	13		3	Ziegefurche Insp.	44	146		85
Ropenick und Zugeho- rige Dorffer					Werbensche Inspec.	43	157		90
Die Frankoff. Ge- meinde zu Spandow					Wilknattische Insp.	19	80		42
Duranienburg	12	30		22	Wusterhausensche Insp.	71	251		127
Reformirte Gemeinde zu Duranienburg					Calbische Inspec.	67	201		120
Bernavische Inspec.	62	231	2	100	Templinische Insp.	27	117		63
Granseische Inspec.	15	62		29	Gramzowische Insp.	36	135	7	59
Reformirte Gemeinde zu Gransee.					Osterburgische Insp.	32	147		78
Prenklowische Inspec.	257	802	23	361	Straakburgische Insp.	25	138		69
Fossische Inspec.	41	161		80	Trebbin	7	44	2	18
Forschimsthal und Zuge- hörige Dorffer	9	49	5	13	Teltow	1	30		8
					Liebenberg.	10	24		4
					Storckowische Insp.	37	178	1	66
					Alten Landsberg und Zugehörige Dorffer	9	24		17
					Reform. Gem. zu				
					Alten Landsburg				
					Buchbolk	11	32	1	11

The Sum of the Marry'd, 3698, Christen'd, 13776. whereof Bastards, 173. Deceased, 7148.
XXXIII. Mar-

XXXIII. Marriages, Births and Burials, in the Dominion of the E. of Brandenburg.

In the Year 1698.	Marry'd	Christen'd	Bury'd	n. 261. p. 508.
In der Chur-und Mark-Brandenburg.	3702	13793	7149	
In der Neu-Ward und Lande Sternberg.	1528	5946	3211	
Im Herkogthumb Preussen.	6161	21803	17091	
Im Herkogthumb Magdeburg.	1357	5480	3042	
Im Herkogthumb Cleve und Graffschaft Mark.	1888	6178	4215	
Im Herkogthumb Pommern.	1714	7244	4827	
Im Furstenthumb Halberstadt.	488	2297	1192	
Im Furstenthumb Minden	525	1937	1326	
In der Graffschaft Hohenstein.	145	568	415	
In der Graffschaft Ravensberg.	665	2223	1789	
In der Herrschaft Lauenburg und Butow.	125	495	421	
The Sum	18298	67763	44678	

XXXIV. The City of *Breslaw* is the Capital City of the Province of *Silesia*; or, as the Germans call it, *Schlesia*: And is situated on the Eastern Bank of the River *Oder*, anciently called *Viadrus*, near the Confines of *Germany* and *Poland*, and very nigh the *Latitude* of *London*. It is very far from the Sea, and as much a *Mediterranean* Place as can be desired; whence the Confluence of *Strangers* is but small; and the Manufacture of *Linnen* employs chiefly the poor People of the Place, as well as of the Country round about, whence comes that sort of *Linnen* we usually call your *Schlesie Linnen*, which is the chief, if not the only Merchandize of the Place. For these Reasons the *Degrees* of *Mortality* in this City seem most proper for a *Standard*; and the rather, for that the *Births* do a small Matter exceed the *Funerals*. The only thing wanting is the *Number* of the whole People, which in some Measure I have endeavoured to supply by comparison of the *Mortality* of the People of all *Ages*; which I shall Trace out with all the *Accuracy* possible, from the curious Tables of the *Births* and *Funerals*, drawn up Monthly by *Dr. Newman* of that City.

It thence appears, that in the *Five Years* from 87 to 91 Inclusive, there were *Born* 6193 Persons, and *buried* 5869; that is *Born per Annum* 1238, and *buried* 1174. Whence an *Encrease* of the People may be argued of 64 *per Annum*, or of about a 20th part; which may perhaps be ballanced by the *Levies* for the *Emperor's* Service in his Wars. But this being contingent and the *Births* certain, I will suppose the People of *Breslaw* to be encreased, by 1238 *Births* Annually. Of these it appears by the same Tables, that 348 do die Tearly in the *First Tear* of their Age, and that but 890 do arrive at a full *Tear's* Age; and likewise, that 193 do die in the *Five Years* between 1. and 6 compleat; taken

at

as a *Medium*; so that but 692 of the Persons *Born* do survive 6 whole *Years*. From this Age the Infants, being arrived at some degree of Firmness, grow less and less Mortal; and it appears that of the whole People of *Breslaw* there die *Tearly*, as in the following *Table*; wherein the upper *Line* shews the *Age*, and the next under it the *Numbers* of Persons of that Age dying *Tearly*.

7. 8. 9. . . 14. . . 18. . . 21. . . 27. 28. . . 35. 36. . . 42. . . 45. . .
 11. 11. 6. $5\frac{1}{2}$. 2. $3\frac{1}{2}$. 5. 6. $4\frac{1}{2}$. $6\frac{1}{2}$. 9. 8. 7. 7. 8. $9\frac{1}{2}$. 8. 9. 7. 7.
 49. 54. 55. 56. . . 63. . . 70. 71. 72. . . 77. . . 81. . . 84. . . 90.
 10. 11. 9. 9. 10. 12. $9\frac{1}{2}$. 14. 9. 11. 9. 6. 7. 3. 4. 2. 1. 1.
 91. 98. 99. 100.
 1. 0. $\frac{1}{2}$. $\frac{1}{2}$.

And where no *Figure* is placed over, it is to be understood of those that die between the *Ages* of the preceding and consequent Column.

From this *Table* it is evident, that from the Age of 9 to about 25, there does not *die* above 6 *per Annum* of each Age, which is much about one *per Cent.* of those that are of those Ages: And whereas in the 14, 15, 16, 17, Years there appear to *die* much fewer, as 2 and 3 $\frac{1}{4}$; yet that seems rather to be attributed to Chance; as are the other Irregularities in the Series of *Ages*, which would rectify themselves, were the Number of Years much more considerable, as 20 instead of 5. And by our own Experience in *Christ-Church Hospital*, I am informed there *die* of the *Young Lads*, much above One *per Cent. per Annum*, they being of the aforesaid *Ages*. From 25 to 50, there seem to die from 7 or 8, and 9, *per Annum* of each *Age*; and after that to 70, they growing more crasse, though the *Number* be much diminished, yet the *Mortality* encreases, and there are found to die 10 or 11 of each *Age per Annum*. From thence the *Number* of the *Living* being very small, they gradually decline till there be none left to *die*; and may be seen at one view in the *Table*.

From these Considerations I have formed the adjoynd *Table*, whose Uses are manifold, and give a more just *Idea* of the *State* and *Condition* of *Mankind*, than any thing yet extant that I know of. It exhibits the *Number* of People in the City of *Breslaw* of all *Ages* from the *Birth* to extreme old *Age*, and thereby shews the *Chances* of *Mortality* at all *Ages*; and likewise how to make a certain *Estimate* of the *Value* of *Annuities* for *Lives*, which hitherto has been only done by an imaginary *Valuation*; also the *Chances* that there are that a Person of any *Age* proposed does *live* to any other *Age* given; with many more, as I shall hereafter shew. This *Table* does shew the *Number* of Persons that are *living* in the *Age* *Current* annexed thereto, as follows.

Age

Age Cur	Per- sons	Age Cur	Per- sons	Age Cur	Per- sons	Age Cur	Per- sons	Age Cur	Per- sons	Age Cur	Per- sons	Age	Persons
1	1000	8	680	15	628	22	586	29	539	36	481	7	5547
2	855	9	670	16	622	23	597	30	531	37	472	14	4504
3	798	10	661	17	616	24	573	31	523	38	463	31	4270
4	760	11	653	18	610	25	567	32	515	39	454	28	3964
5	732	12	646	19	604	26	560	33	507	40	445	35	3604
6	710	13	640	20	598	27	553	34	499	41	436	42	3178
7	692	14	634	21	592	28	546	35	490	42	427	49	2709
Age Cur	Per- sons	Age Cur	Per- sons	Age Cur	Per- sons	Age Cur	Per- sons	Age Cur	Per- sons	Age Cur	Per- sons	Age	Persons
43	417	50	346	57	272	64	202	71	131	78	58	56	2194
44	407	51	335	58	262	65	192	72	120	79	49	63	1694
45	397	52	324	59	252	66	182	73	109	80	41	70	1204
46	387	53	313	60	242	67	172	74	98	81	34	77	692
47	377	54	302	61	232	68	162	75	88	82	28	84	253
48	367	55	292	62	222	69	152	76	78	83	23	100	107
49	357	56	282	63	212	70	142	77	68	84	20	Sum Total	34000

Thus it appears, that the *Whole People* of *Breslaw* does consist of 34000 Souls, being the *Sum Total* of the *Persons* of all *Ages* in the *Table*.

The *first Use* hereof is to shew the *Proportion* of *Men* able to bear *Arms* in any Multitude, which are those between 18 and 56, rather than 16 and 60; the one being generally too weak to bear the *Fatigues* of *War*, and the weight of *Arms*, and the other too crasie and infirm from *Age*, notwithstanding particular *Instances* to the contrary. Under 18, from the *Table*, are found in this *City* 11997 *Persons*, and 3950 above 56, which together make 15947. So that the residue to 34000, being 18053, are *Persons* between those *Ages*. At least one half thereof are *Males*, or 9027. So that the whole *Force* this *City* can raise of *Fencible Men*, as the *Scotch* call them, is about 9000, or $\frac{1}{4}$, or some what more than a *Quarter*, of the *Number* of *Souls*; which may perhaps pass for a *Rule* for all other places.

The *second Use* of this *Table* is to shew the differing *Degrees* of *Mortality*, or rather *Vitality*, in all *Ages*: for if the *Number* of *Persons* of any *Age* remaining after one *Year*, be *Divided* by the difference between that and the *Number* of the *Age* proposed, it shews the odds that there is, that a *Person* of that *Age* does not die in a *Year*. As for Instance, a *Person* 25 *Years* of *Age* has the odds of 560 to 7, or 80 to 1, that he does not die in a *Year*: Because that of 567 living of 25 *Years* of *Age*, there do die no more than 7 in a *Year*, leaving 560 of 26 *Years* old.

So likewise for the odds, that any *Person* does not die before he attain any proposed *Age*, take the *Number* of the remaining *Persons* of the *Age* proposed, and divide it by the difference between it and the *Number* of those of the *Age* of the party proposed; and that shews the odds there

is between the Chances of the Parties Living or Dying. As for instance; what is the odds that a Man of 40 Lives 7 Years? Take the Number of Persons of 47 Years, which in the Table is 377, and Subtract it from the Number of Persons of 40 Years, which is 445, and the difference is 68, which shews that the Persons Dying in that 7 Years are 68, and that it is 377 to 78, or 5 $\frac{1}{2}$ to 1, that a Man of 40 does Live 7 Years. And the like for any other Number of Years.

Use III. But if it be required at what Number of Years it is an even Lay, that a Person of any Age shall die, this Table readily performs it: For if the Number of Persons Living of the Age proposed, be halved, it will be found by the Table at what Year the said Number is reduced to half by Mortality; and that is the Age, to which it is an even Wager, that a Person of the Age proposed shall arrive before he die. As for Instance a Person of 30 Years of Age is proposed, the Number of that Age is 531, the half thereof is 275, which Number I find to be betwixt 57 and 58 years; so that a Man of 30 may reasonably expect to Live between 27 and 28 Years.

Use IV. By what hath been said, the Price of Insurance upon Lives ought to be regulated: and the difference is discovered between the Price of Ensuring the Life of a Man of 20 and 50, for Example; it being 100 to 1, that a Man of 20 dies not in a Year, and but 38 to 1, for a Man of 50 Years of Age.

Use V. On this depends the Valuation of Annuities upon Lives: for it is plain, that the Purchaser ought to Pay for only such a part of the Value of the Annuity, as he has Chances that he is Living; and this ought to be computed Yearly, and the Sum of all those Yearly Values, being added together, will amount to the Value of the Annuity for the Life of the Person proposed.

Now the present Value of Money payable after a Term of Years, at any given Rate of Interest, either may be had from Tables already computed, or almost as Compendiously, by the Table of Logarithms: For the Arithmetical Complement of the Logarithm of Unity and its Yearly Interest (that is, of 1, 05. for 6 per Cent. being 9,974,694.) being multiplied by the Number of Years proposed, gives the present Value of one Pound payable after the end of so many Years. Then by the foregoing Proposition, it will be, as the Number of Persons Living after that Term of Years, to the Number Dead, so are the odds that any one Person is alive or Dead. And by Consequence, as the Sum of both, or the Number of Persons Living of the Age first proposed, to the Number remaining after so many Years, (both given by the Table,) so the present Value of the Yearly Sum payable after the Term proposed, to the Sum which ought to be payed for the Chance the Person has to enjoy such an Annuity so many Years. And this being repeated for every Year of the Person's Life, the Sum of all the present Values of those Chances is the true Value of the Annuity. This will without doubt appear to be a most Laborious Calculation: But it being one of the Principa

Principal Uses of this Speculation, and having found some Compendia for the Work, I took the Pains to Compute the following Table; being the short Result of a not Ordinary Number of Arithmetical Operations. It shews the Value of Annuities for every Fifth Year of Age, to the 70th, as follows.

Age	Year's Purchase	Age	Year's Purchase	Age	Year's Purchase
1	10,28	25	12,27	50	9,21
5	13,40	30	11,72	55	8,51
10	13,44	35	11,12	60	7,60
15	13,33	40	10,57	65	6,54
20	12,78	45	9,91	70	5,32

Use VI. Two Lives are likewise Valuable by the same Rule: For the Number of Chances of each Single Life, found in the Table, being Multiplied together, become the Chances of the Two Lives. And after any certain Term of Years, the Product of the Two Remaining Sums is the Chances that Both the Persons are Living; the Product of the Two Differences, being the Numbers of the Dead of both Ages, are the Chances that Both the Persons are Dead; and the Two Products of the Remaining Sums of the One Age Multiplied by those Dead of the Other, shew the Chances that there are that Each Party Survives the Other; Whence is derived the Rule to Estimate the Value of the Remainder One Life after another. Now as the Product of the Two Numbers in the Table for the Two Ages Proposed, is to the Difference between that Product and the Product of the Two Numbers of Persons Deceas'd in any space of Time, so is the Value of a Sum of Money to be paid after so much Time, to the Value thereof under the Contingency of Mortality. And as the aforesaid Product of the two Numbers answering to the Ages propos'd, to the Product of the Deceased of one Age Multiplied by those Remaining Alive of the other, so the Value of a Sum of Money to be paid after any Time proposed, to the Value of the Chances that the One Party has, that he Survives the Other whose Number of Deceased you made use of in the 2d Term of the Proportion. This perhaps may be better understood by putting N , for the Number of the Younger Age; and n , for that of the Elder, Yy , the Deceased of Both Ages respectively; and Rr , for the Remainders, and $R + Y = N$, and $r + y = n$. Then shall Nn , be the whole Number of Chances; $Nn - Yy$, the Chances that One of the 2 Persons is Living; Yy , the Chances that they are both Dead; Ry , the Chances that the Elder Person is Dead and the Younger Living; and rY , the Chances that the Elder is Living and the Younger Dead. Thus 2 Persons of 18 and 35 are Proposed, and after 8 Years these Chances are required. The Numbers for 18 and 35 are 610 and 490, and there are 50 of the First Age Dead in 8 Years, and 73 of the Elder Age. There are in all 610×490 , or 298900 Chances; of these there are 50×73 , or

3650, that they are Both Dead. And as 298902, to 298900, — 3650, or 295250, So is the Present Value of a Sum of Money to be paid after 8 Years, to the Present Value of a Sum to be paid if either of the Two Live. And as 560×73 , so are the Chances that the Elder is Dead, leaving the Younger; and as 417×50 so are the Chances that the Younger is Dead, leaving the Elder. Wherefore as 610×490 to 560×73 , so is the Present Value of a Sum to be paid at 8 Years End, to the Sum to be paid for the Chance of the Younger's Survivance; and as 610×490 , to 417×50 , so is the same Present Value, to the Sum to be paid for the Chance of the Elder's Survivance.

Fig. 81.

This possibly may be yet better Explained by Expounding these Products by Rectangular Parallelograms, as in Fig. 81, wherein AB , or CD , represents the Number of Persons of the Younger Age; and DE , BH , those Remaining Alive after a Certain Term of Years: whence CE , will answer the Number of those Dead in that time: So AC , BD , may represent the Number of the Elder Age; AF , BI , the Survivors after the same Term; and CF , DI , those of that Age that are Dead at that Time. Then shall the Whole Parallelogram $ABCD$, be Nn , or the Product of the Two Numbers of Persons, representing such a Number of Persons of the 2 Ages given; and, by what was said before, after the Term Proposed the Rectangle HD , shall be as the Number of Persons of the Younger Age that Survive, and the Rectangle AE , as the Number of those that Die. So likewise the Rectangles AI , FD , shall be as the Numbers Living, and Dead, of the other Age. Hence the Rectangle HI , shall be as an Equal Number of both Age Surviving; The Rectangle FE , being the Product of the Deceased Y , an equal Number of both Dead; The Rectangle GD , or Ry , a Number Living of the Younger Age, and Dead of the Elder; and the Rectangle AG , or rY , a number Living of the Elder Age, but Dead of the Younger. This being understood, it is Obvious, that as the Whole Rectangle AD , or Nn , is to the Gnomon $FABDEG$, or $Nn - Yy$, so is the Whole Number of Persons or Chances to the Number of Chances that one of the 2 Persons is Living. And as AD , or Nn , is to FE , or Yy , so are All the Chances, to the Chance, that Both are Dead; whereby may be Computed the Value of the Reversion after Both Lives. And as AD , to GD , or Ry , so the Whole Number of Chances, to the Chances that the Younger is Living and the Other Dead; whereby may be Cast up what Value ought to be paid for the Reversion of One Life after another, as in the Case of providing for Clergymens Widows and others by such Reversions. And as AD , to AG , or rY , so are All the Chances, to those that are Elder Survivors to the Younger. I have been the more particular, and perhaps Tedious, in this matter, because it is the Key to the Case of Three Lives, which of itself would not have been so easy to Comprehend.

Use. VII. If Three Lives are Proposed, to find the Value of an Annuity during the continuance of any of those Three Lives, the Rule is, As the Product of the Continual Multiplication of the 3 Numbers in the Table, answering to the Ages Proposed, is to the Difference of that Product and of the Product of the 3 Numbers of the Deceased of those Ages in any given term of

of Years, so is the Present Value of a Sum of Money to be paid Certainly after so many Years, to the Present Value of the same Sum to be paid provided One of these 3 Persons be Living at the Expiration of that Term. Which Proportion being Yearly Repeated, the Sum of all those Present Values will be the Value of an Annuity granted for 3 such Lives. But to explain this, together with all the Cases of Survivance in 3 Lives, Let N , be the Number in the Table for the Younger Age; n , for the Second and v , for the Elder Age: let x , be those Dead of the Younger Age in the Term propos'd; y , those Dead of the Second Age; and z , those of the Elder Age: and let R be the Remainder of the Younger Age; r , that of the Middle Age and s , the Remainder of the Elder Age. Then shall $R + x$, be Equal to N ; $r + y$, to n ; and $s + z$, to v ; and the Continual Product of the 3 Numbers N, n, v , shall be Equal to the Continual Product of $R + x \times r + y \times s + z$, which being the Whole Number of Changes for 3 Lives is Compounded of the eight Products following, (1) $R \times s$, which is the Number of Chances that All 3 of the Persons are Living; (2) $r \times y$, which is the Number of Chances that the 2 Elder Persons are Living, and the Younger Dead; (3) $R \times z$, the number of Chances that the Middle Age is Dead and the Younger and Elder Living; (4) $R \times v$, being the Chances, that the 2 Younger are Living and the Elder Dead; (5) $s \times x$, the Chances that the 2 Younger are Dead and Elder Living; (6) $r \times z$, the Chances that the Younger and Elder are Dead and the Middle Age Living; (7) $R \times y$, which are the Chances that the Younger is Living and the two Other Dead; (8) $x \times y$, which are the Chances that All Three are Dead; Which Latter Subtracted from the Whole Number of Chances $N n v$, leaves $N n v - x y z$, the Sum of all the other 7 Products, in all of which One or More of the 3 Persons are Surviving.

To make this yet more Evident, I have Added Fig. 82, wherein these 8 several Products are at One view Exhibited. Let the Rectangled Parallelepipedon, $ABCDEF GH$, be Constituted of the sides AB, GH , &c. Proportional to N , the Number of the Younger Age; AC, BD , &c. Proportional to n ; and AG, CE , &c. Proportional to the Number of the Elder, or v ; And the Whole Parallelepipedon shall be as the Product $N n v$, or our Whole Number of Chances. Let BP , be as R , and AP , as x : let CL , be as r ; and LN , as y ; and GN , as s ; NA , as z : and let the Plain $PREA$, be made parallel to the Plain $ACGE$; the Plain NVH , parallel to $ABCD$; and the Plain $LXTQ$ parallel to the Plain $ABGH$: And our First Product $R \times s$, shall be as the Solid $STWIFZ$; The Second, or $r \times y$, will be as the Solid $ETZeQSMI$; The 3d. $R \times z$, as the Solid $RHOVWIST$; And the 4th, $R \times v$, as the Solid $ZabDWXIK$; Fifthly, $s \times x$, as the Solid $GQRSIMNO$; Sixthly, $r \times z$, as $IKLMGTZA$; Seventhly, $R \times y$, as the Solid $IKPOBXVW$; And lastly, $AIKLMNOP$, will be as the Product of the 3 Numbers of Persons Dead, or $x y z$.

I shall not Apply this in all the Cases thereof for Brevity's sake: only to shew in one how all the rest may be performed, let it be Demanded, What is the Value of the Reversion of the Younger Life after the Two Elder Proposed? The Proportion is, as the Whole Number of Chances, or

$$R r r r z$$

$$N n v,$$

Fig. 82.

Nn v, to the Product *R y v*, so is the Certain Present Value of the Sum payable after any Term Proposed, to the Value due to such Chances as the Younger Person has to Bury Both the Elder, by the Term Proposed; which he therefore is to pay for. Here is to be noted, that the First Term of all these Proportions is the same throughout, viz. *Nn v*. The Second Changing Yearly according to the Decrease of *R r e*, and Encrease of *R y v*. And the 3d. are Successively the Present Values of Money payable after One, Two, Three, &c. Years, according to the Rate of Interest Agreed on. These Numbers, which are in all Cases of Annuities of necessary use, I have put into the Following Table, they being the Decimal Values of One Pound payable after the Number of Years in the Margent, at the Rate of 6 per Cent.

Years	Present Value of 1 l.	Years	Present Value of 1 l.	Years	Present Value of 1 l.
1	0,9434	19	0,3305	37	0,1158
2	0,8900	20	0,3118	38	0,1092
3	0,8396	21	0,2941	39	0,1031
4	0,7921	22	0,2775	40	0,0272
5	0,7473	23	0,2618	45	0,0726
6	0,7050	24	0,2470	50	0,0543
7	0,6650	25	0,2330	55	0,0406
8	0,6274	26	0,2198	60	0,0303
9	0,5919	27	0,2074	65	0,0227
10	0,5584	28	0,1956	70	0,0169
11	0,5268	29	0,1845	75	0,0126
12	0,4970	30	0,1741	80	0,0094
13	0,4688	31	0,1643	85	0,0071
14	0,4423	32	0,1550	90	0,0053
15	0,4173	33	0,1462	95	0,0039
16	0,3936	34	0,1379	100	0,0029
17	0,3714	35	0,1301		
18	0,3503	36	0,1227		

It were needless to advertise, that the great trouble of working so many Proportions will be very much Alleviated by using Logarithms; and that instead of using *Nn v*—*R y v*, for the 2d Term of the Proportion in finding the Value of 3 Lives, it may suffice to use only *R y v*, and then Deducting the 4th Term so found out of the 3d, the Remainder shall be the Present Value sought: or all these 4 Terms being Added together, and Deducted out of the Value of the Certain Annuity for so many Years, will Leave the Value of the Contingent Annuity upon the Chance of Mortality of all those 3 Lives. For Example; Let there be 3 Lives of 20, 30, and 40 Years of Age Proposed, and the Proportions will be thus.

As 661 in 531 in 445, or 156190995, or Nⁿ v,

to 8 in 8 in 9, or 576, or Ty v,	for the First Year, so 0,9434, to 0,00000348
to 15 in 16 in 18, or 4320,	for the Second Year. so 0,8900, to 0,00002462
to 21 in 28 in 24, or 14112,	for the Third Year. so 0,8396, to 0,00008128
to 27 in 32 in 38,	for the 4th Year. so 0,7921, to 0,00016650
to 33 in 41 in 48,	for the 5th Year. so 0,7473, to 0,00031071
to 36 in 59 in 58,	for the 6th Year. so 0,7050, to 0,00051051

and so forth :o the 60th Year, when we suppose the Elder Life, of 40 Certainly to be Expired ; from whence till 70, we must Compute for the First and Second only ; and from thence to 90, for the Single Youngest Life. Then the Sum Total of all these 4 Proportionals being taken out of the Value of a Certain Annuity for 90 Years, being 16,58 Years Purchase, shall Leave the Just Value to be paid for an Annuity during the Whole Term of the Lives of 3 Persons of the Ages Proposed. And Note, that it will not be Necessary to compute for every Year Singly, but that in Most Cases every 4th or 5th Year may suffice, Interpoling for the intermediate years Secundum Artem.

It may be Objected that the Different Salubrity of Places does hinder this Proposal from being Universal ; nor can it be Denied : But by the Number that Die, being 1174 per Annum in 34000, it does appear that about a 30th part Die yearly, as Sir Will. Petty has Computed for London ; and the Number that Die in Infancy, is a good Argument, that the Air is but Indifferently Salubrious. So that by what I can Learn, there cannot perhaps be One Better place proposed for a Standard.

I have sought if it were possible to find a Theorem that might be more Concise than the Rules before laid down : But in vain ; for all that can be done to Expedite it, is by Tables of Logarithms ready Computed, to Exhibit the Rationes of N, to T, in each Single Life, for every 3d, 4th or 5th Year of Age, as Occasion shall require ; and these Logarithms being Added to the Logarithms of the Present Value of Money payable after so many Years, will give a Series of Numbers, the Sum of which will shew the Value of the Annuity sought. However for Each Number of this Series, Two Logarithms for a Single Life, 3 for 2 Lives, and 4 for 3 Lives, must necessarily be Added together.

It may not perhaps be Unacceptable to observe farther from these Tables, how Unjustly we Repine at the Shortness of our Lives, and think our selves Wrong'd if we attain not Old Age ; whereas it appears hereby, that the One Half of those that are Born are Dead in 17 Years Time, 1238 being in that Time Reduced to 616. So that instead of Murmuring at what we call an Untimely Death, we ought to account it as a Blessing that we have Survived ; perhaps by Many Years, that Period of Life, whereat the one Half of the Whole Race of Mankind does not Arrive.

I shall

I shall also observe, that the *Growth and Increase of Mankind* is not so much *Stented* by any thing in the nature of the *Species*, as it is from the *Cautious Difficulty* most People make to adventure on the State of *Marriage*, from the Prospect of the *Trouble and Charge* of providing for a *Family*. For by *Computation* from the *Table*, I find that there are nearly 15000 Persons above 16 and under 45, of which at least 7000 are *Women Capable to Bear Children*: Of these notwithstanding there are but 1238 *Born* yearly, which is but little more than a 6th part. So that about One in 6 of these *Women*, do *Breed* yearly: whereas were they *All Married*, it would not Appear Strange or *Unlikely*, that 4 of 6, should bring a *Child* Every Year. The *Political Consequences* hereof I shall not insist on; only the *Strength and Glory* of a *King*, being in the *Multitude* of his *Subjects*, I shall Hint, that above all thing *Celibacy* ought to be *Discouraged*; as by *Extraordinary Taxing* and *Military Service*: And those who have *Numerous Families* of *Children* to be *Countenanced* and *Encouraged*, by such *Laws* as the *Jus Trium Liberorum* among the *Romans*; But especially by an *Effectual Care* to provide for the *Subsistence* of the *Poor*, by finding them *Employments*, whereby they may *Earn* their *Bread*, without being *Chargeable* to the *Publick*.

Problems touching Compound Interest and Annuities; Resolv'd by Mr. Adam Martindale; with Explications, by Mr. J. Collins. Ph. Col. B. 1. p. 34.

XXXV. Twelve Problems touching *Interest Compound*, and *Annuities*, Expressed in *Symbols*, to be Resolved by *Logarithms*, and Distinguished into three Ranks whose *Symbols* are thus to be understood.

p r t a s d	Signifies	Principal	} Common to all the 3 Ranks.
		Rate, viz. 1. lib. with its Rate	
		Time	
		Amount or Aggregate	} proper to { 1. { Rank. 2. { 3. {
		Sum of Principal and Arrearages	
Difference of Principal and Worth			

Their Capitals stand for the *Logarithms* of the Number Signified by the Small Letters. D, signifies *Data*; Q, *Quæsitum*; Prob. *Problem*; Res. *Resolution*.

The First Rank, touching *Compound Interest* for a *Single Sum* of Money.

1. Prob. D. p, r, t. Q. a? Res. $Rt + P = A$.
2. Prob. D. a, r, t. Q. p? Res. $A - Rt = P$.
3. Prob. D. p, a, t. Q. r? Res. $\frac{A - P}{t} = R$.
4. Prob. D. p, r, t. Q. r? Res. $\frac{A - P}{R} = t$.

The Second Rank concerning *Annuities in Arrear* at *Compound Interest*, grounded upon these two *Axioms*.

1. The *Annuity* and *Rate of Interest* being Given, the *Principal Correspondent* to the *Annuity* is in *Effect* given also; being easily found out by the *Rule of Three*; thus,

As the Interest of any Principal, (ex. gr. of 1. ro. 100. Gr.) is to that Principal: So the Annuity or Pension, to it's Principal.

2. The Sum of the Principal and the Arrearage of All the Payments being found, the Arrearages alone may be obtain'd by Subtracting the Principal from that Sum.

The Problems are these that follow.

1. Prob. D. $p, r, t.$ Q. $s?$ Ref. $Rt + P = S.$

2. Prob. D. $p, r, t.$ Q. $p?$ Ref. $S - Rt = P.$

3. Prob. D. $p, s, t.$ Q. $r?$ Ref. $\frac{S - P}{t} = R.$

4. Prob. D. $p, s, r.$ Q. $t?$ Ref. $\frac{S - P}{R} = t.$

The Third Rank, touching Annuities Anticipated, or bought for a Sum in hand (or equivalent thereto) at Compound Interest Discounted, bottom'd upon the Former of the Two Axioms above-mention'd, and This that Followeth;

If the Difference and Worth be once found, the Worth is easily obtain'd, by Subtracting that Difference out of the Principal, which is ever greater, being the Worth of the Annuity at that Rate for ever.

1. Prob. D. $p, r, t.$ Q. $d?$ Ref. $P - Rt = D.$

2. Prob. D. $d, r, t.$ Q. $p?$ Ref. $D + Rt = P.$

3. Prob. D. $p, d, t.$ Q. $r?$ Ref. $\frac{P - D}{t} = R.$

4. Prob. D. $p, d, r.$ Q. $t?$ Ref. $\frac{P - D}{R} = t.$

XXXVI. There are 2 Loteries, at either of which a Gamester paying a Shilling for a Lot, or Throw, the First Lottery upon a Just Computation of the Odds has 3 to One of the Gamester, the 2d Lottery but 2 to 1: Nevertheless the Gamester has the very same Disadvantage (and no more) in Playing at the First Lottery as the Second.

An Arithmetical Paradox concerning the Chances of Lotteries; by Mr. Fr. Roberts. n. 198. p. 677.

It looks very like a Contradiction, that the Disadvantage should be no greater in Playing against 3 to 1, than 2 to 1, but it may thus be Resolved.

Let the {1st.} Lottery {3} Blanks {3} Prizes {16 Pence} a Peice.
{2d.} consist of {4} and {2} of {2 Shil.}

In the First Lottery the Gamester Hazards a Shilling to Win a Groat, and the Changes being Equal, it is evident there is 3 to 1, against him.

In the 2d Lotery the Gamester Ventures a Shilling against a Shilling, and the Lots being 4 to 2, his Disadvantage is Two to One.

And yet a Lot at either of them being truly Just Worth 8 Pence, (viz. the 6th Part of 3 Times 16 Pence, or Twice 2 Shillings) the Disadvantage must be the very same in both Cases; that is the Gamester pays a Shilling for a Lot that is Worth but 8 Pence.

The

The Method of Finding this Answer being somewhat out of the Common Road, I shall here add it ; and thereby Infinite Solutions of the same Kind may be discover'd.

1st Lottery.

Let a = the Number of *Blanks*.

b = the Number of *Prizes*.

r = the Value of a *Prize*.

x = to what you pay for a *Lot*, viz. a *Shilling*.

2d Lottery.

m = the Number of *Blanks*.

n = the Number of *Prizes*.

s = the Value of a *Prize*.

So the *Lottery* has its *Chances* for x , and the *Gamester* his for $r-x$. Now the *True Odds* consisting of the *Compounded Proportion* of the *Chances*

and the *Values* ; viz. $\frac{a}{b}$ and $\frac{x}{r-x}$, the *Share* of the *Lottery* will be a ,

and that of the *Gamester* $rb-b$. Therefore as the *Present Case* stands, the *First Lottery* must be, $a = 3rb-3b$; and by the like Reasoning the *Second Lottery* will be $m = 2sn-2n$. Now the *Value* of a *Lot* being the *Sum* of the *Prizes* *Divided* by the *Number* of *Lots*, (which must be E-

qual in both *Lotteries*) it yields $\frac{rb}{a+b} = \frac{sn}{m+n}$

So to proceed.

$$\begin{array}{l}
 a \\
 b \\
 r \\
 n \\
 s \\
 q
 \end{array}
 \left\{
 \begin{array}{l}
 1 \ a = 3rb - 3b \\
 2 \ m = 2sn - 2n \\
 3 \ \frac{rb}{a+b} = \frac{sn}{m+n} \\
 4 \ (*) \\
 5 \ (*) \\
 6 \ (*) \\
 7 \ \text{Let } \frac{rb}{a+b} = q \\
 8 \ rb = qa + qb \\
 9 \ 3rb = 3qa + 3qb \\
 10 \ 3rb = a + 3b \\
 11 \ 3qa + 3qb = a + 3b
 \end{array}
 \right.$$

Scope

11, 12

13 $\div 3b$

12, 14

Scope

11, 16

17 $\div 3a$

16, 18

12 If $a = 0$, to avoid *Negative Numbers*.

13 $3b = 3qb$

14 $q = 1$

15 $q > 1$, makes $a < 0$; $q < 1$, makes $a > 0$

16 If $b = 0$

17 $3qa = a$

18 $q = \frac{1}{3}$

19 $q < \frac{1}{3}$, makes $b < 0$; $q > \frac{1}{3}$ makes $b > 0$

5, 7	20	$\frac{3n}{m+n} = q$
10 $\times m + n$	21	$3n = qm + qn$
11 $\times 2$	22	$2:3n = 2qm + 2qn$
12 $+ 2n$	23	$2:3n = m + 2n$
13, 23	24	$2qm + 2qn = m + 2n$
Scope	25	If $m = 0$
24, 25	26	$2qn = 2n$
26 $\div 2n$	27	$q = 1$
25, 27	28	$q \neq 1$ makes $m < 0$; $q < 1$ makes $m < 0$
Scope	29	If $n = 0$
24, 29	30	$2qm = m$
30 $\div 2m$	31	$q = \frac{1}{2}$
29, 31	32	$q < \frac{1}{2}$ makes $n < 0$; $q > \frac{1}{2}$ makes $n > 0$
15, 19, 28, 32,	33	that $abmn$ may be $\neq 0$, q must be $\neq \frac{1}{2} \angle 1$.
33, 4 (*)	34	Let therefore $q = \frac{r}{b}$
7, 34	35	$\frac{3n}{a+b} = \frac{r}{b}$
35 $\times, 10$	36	$3rb = a + 2b = n + 3b$
36	37	$a = b$
20, 34	38	$\frac{3n}{m+n} = \frac{1}{2}$
38 $\times$	39	$3:3n = 2m + 2n$
39 $\times 2$	40	$6:3n = 4m + 4n$
23 $\times 3$	41	$6:3n = 3m + 6n$
40, 41	42	$4m + 4n = 3m + 6n$
42	43	$m = 2n$
1 $\div 37$	44	$1 = 3r - 3$
44 $+ 3$	45	$3r = 4$
2 $\div 4, 43$	46	$2 = 2r - 2$
46 $+ 2$	47	$2r = 4$
5 (*)	48	Let $A = 3$
37, 48	49	$B = 3$
43 $\div 3$	50	$R = \frac{1}{2}$ i. e. 16. Pence
6 (*)	51	Let $M = 4$
43, 51	52	$N = 2$
47 $\div 2$	53	$S = 2$ i. e. 2 Shillings

XXXVII. Papers Overlook'd till 'twas too late too insert them in their proper Places.

A Diseased Kidney; by S. Malpighi. n. 160. p. 607.

Vid. Vol. III. Par. I. Cap. IV. Sect. LIII.

I. Monstruosum aliquid, in Illustrissimi Juvenis *Antonii Francisci Davia*, *Excelsi Antianorum Consulis*, Cadavere observatum, non parum exaratam a me *Renum* Structuram illustrat. Hujus *Ren* Sinister, exiguus mole, exterius quasi Congeriem & Racemum *Uvae Albæ* exhibebat, multiplicibus scilicet *Glandulosis Folliculis*, veluti tot exiguis *Bottis* congestus: Hi *Insignibus Excretoriis* vasis, quibus de more *Renum* caro excitatur, haud donabantur, sed Immediate expanso *Pelvi*, vel saltem brevissimo *Ductu*, necabantur. *Venæ & Arteriæ* singula irragabant, & *Ureter* à *Pelvi* producebatur. *Ren* Dexter mole longe major erat, & exterius insignes *Glandulæ*, quasi *Vesiculæ Urinae* turgidæ, e-rumpebant. Congeries quoque *Excretoriorum Vasorum*, quibus *Renum* caro conflatur, amplior & latior solito erat, & appensa *Glandulæ* *Amplæ* quasi *Vesiculæ* interferebantur. Harum aliquæ *Corrupto & Subnigricante Sanguine* Scatebant, reliquæ *Urinae* turgabant, vel *Arenulis Tartareaque Materia* referebantur. Ex hac itaque *Renum*, licet *Monstruosa*, sed *Simplici Structura*, evidenter patet, præcipuas *Renum* partes, præter *Arterias & Venas*, *Glandulas* esse, & *Pelvim*, qui in *Ureteres* productus in *Glandulis Lotium* per *Excretoria Vasa* recipit, & sensim in *Vesicam* derivat. Turgebant autem *Glandulæ*, & *Monstruosa* deformabantur *Specie*, quia impedita *Excrementi* expulsionem in *Pelvim*, necessario stagnante intus *Urina* laxabatur *Glandulosa* *Compages*, & in aliquibus etiam loco *Seri* *Rebicunda Sanguinis* portio continebatur; impedito scilicet per *Venas* regressu, vel lacerato separationis *Organo*. Hoc idem in reliquis *Glandulis* accidit vi *Morbi*, & præcipue in *Fecore*, in quo vigente *Cachexia* non raro ipsius *Glandulosi Acini* turgente *Bile*, quandoque *Sero* aut *Tartaro*, in ampliorem ita extenduntur formam, ut *Vesiculas* emulenter. *Simplicissima* quoque *Glandularum* structura, in pluribus *Partibus* observata, totam confirmet; nam in *Labiis Bovum*, in *Hominis Facie*, circa *Panis Glandem*, in *Intestinis*, & in *Muscularum* *Spaciis* *Minimæ* *Simplicesque* locantur *Glandulæ*, quæ nil aliud sunt, quam *Rotundi*, interdum *Ovales*, & non raro *Oblongi*, folliculi *Excretorio Vasi* continuati, & appensi, quorum varia *Structura* *Diversi* separantur *Humores & Succii*.

The Phosphorus Metallorum; by Sir Rob. Southwell. n. 245. p. 365.

Vid. Vol. III. Par. I. Cap. X. Sect. XI.

2. Take *Lapis Smaragdi Mineralis* (such as is found in the Mines of *Saxony*) and beat it into a very Fine Powder. If you strew this very fine on any *Metal*, and in any Figure, and set the Plate on any *Hot Coals*, in a short Time you will perceive in the Dark a *Light* to shine, which will (saith my Author) last as long as you continue the *Hot Coals*: And if you beat out the Fire, it may do again for *Once* or *Twice*; but then the *Vertue* will fade.

The Texture of Ivory; by Dr. Neh. Grew n. 141. p. 1003. Fig. 83.

3. I have often taken Notice of the Grain of *Ivory*, which upon a due Position to the falling Light is Visible to a *Naked Eye*: The several Pieces, whereof it is Compos'd, appearing like the *Fibres* of a *Muscle*, running in *Parcels Decussatim*, and under and over one another reciprocally, and so making up one Piece of *Platted Work*.

XXXVIII. Papers

XXXVIII. Papers of Less General Use Omitted.

1. **A** Relation of the Advice given by M. Petit, touching the *Conjunction* of the Ocean and *Mediterranean*; by M. . . . n. 5. p. 41.
2. A Narrative of the *Conjunction* of the Ocean and *Mediterranean*, by the Contrivance and Management of M. Riquet: together with a Map of the said Channel; by M. . . . n. 56. p. 1123.
3. Additions to the Foregoing Narrative: in which the Progress and designed Usefulness of that Great Undertaking are more amply represented; by M. de Froidour. n. 84. p. 408a.
4. Divers Rural and Oeconomical Inquiries; by n. 111. p. 240.
5. An Account of some of Dr. Elsholt's Curious and Useful Experiments; Communicated from Berlin to Mr. T. H. Ph. Col. n. 4. p. 104.
6. A Miscellaneous Catalogue of Mean, Vulgar, Cheap, and Simple Experiments; by Sir Will. Petty. n. 167. p. 349.
7. A Register of the Price of Corn, Births and Burials, Quantity of Rain, Earthquakes, Inundations, and Remarkable Fatalities, Solicited by Dr. J. Beale. n. 99. p. 3141.

XXXIX. Letters and Other Papers by M. Ant. van Leewenhoeck, Omitted.

1. **A** Specimen of some Observations, made by a Microscope lately Invented by M. Leewenhoeck, concerning Mould upon Skin, Flesh, and other things; The Sting of a Bee; the Head and Eyes of a Bee, and a Lowse. n. 94. p. 6037. n. 97. p. 6116.
2. Considerations touching the Compression of Air. n. 102. p. 21.
3. Microscopical Observations upon Blood, Milk, Hair, Nails, and the Internal Parts of a Lowse and her manner of Feeding. n. 102. p. 23.
4. Microscopical Observations concerning Blood, Bone, the Liver, Brain, Spinal-Marrow, Flesh, Spittle, and the Cuticula; Also upon Sweat, Wool, Hair, Blood, Earthy Particles in the Air, Fat, and Tears. n. 106. p. 121. n. 112. p. 122.
5. Microscopical Observations upon the Eye, the Optick Nerve and other Nerves; upon Salt, Yellow Earth from England, Flemish Earth, Clay, and a Green Cloud in Water and the Animalcula in it. n. 108. p. 178.
6. Microscopical Observations concerning the Optick Nerve; also about the Texture of the Blood, the Sap of some Plants, the Figures of Salt and Sugar and the probable cause of the Difference of their Taste; and the Figure and Operation of Manna. n. 117. p. 378. n. 120.
7. Observations concerning the Texture of Trees; compared with what has been writ upon that Subject by Dr. Grew and S. Malphigi: Also concerning Animalcules in Wine. n. 127. p. 653.
8. Animalcules discover'd in Rain-Water, River-Water, Well-Water, Sea-Water, and in Water wherein Pepper had been Infused. n. 133. p. 821.
9. The Manner of Observing and Numbering the Animalcules in Water. n. 134. p. 844.

10. Observations on the *Carneous Fibres* of a *Muscle*, the *Fia Mater* and the *Brain*, the *Spinal-Marrow*, *Moxa*, *Cotton*, and the *Roughness* within the *Shell* of a *Chestnut*.
 n. 140. p. 102.
11. *Microscopical Observations* of the *Structure* of *Teeth* and other *Bones*, and of *Hair*.
 n. 142. p. 1040.
12. A Letter to my Lord *Brouncker*, *De Natis i Semine Masculo Animalculis*; Answer'd by *Dr. Grew*; the *Observations* further prosecuted by the *Author*; and *Dr. Grew's Opinion de Vasis in Crassa Seminis Materia Observatis*.
 Ph. Col. n. 1. p. 3.
13. *Animalcles* Discover'd in the *Melt* of a *Live Cod-fish* and *Pikes*; in the *Vasa Deferentia* of a *Male Hare*, and of *Birds*; and in the *Testicles* of a *Dog*, and a *Cock*.
 Ph. Col. n. 3. p. 51.
14. *Microscopical Observations* on *Lees of Wine*, *Blood*, *Fermenting Syrups*, *Water*, the *Liquor* in the *Vena Lactea*, the *Chyle*, *Milk*, *Urine*, the *Watry Parts* of the *Air*; the *Semen Masculum* of *Insects*; *Pepper-Water*; together with his *Method of Calculating the Minuteness* of the *Animalcles*.
 Ph. Col. n. 4. p. 93.
15. The *Structure* of *Hair* and its manner of *Growing*; The *Excrements* of *Men* and other *Animals*; and the *Particles* of *Clay*.
 Ph. Col. n. 5. p. 252.
16. The *Texture* of the *Muscles* of *Quadrupedes* and *Fish*; the *Growth* of *Hair*; the *Blood* of *Fish*; the *Fins* of *Oysters*; and the *Production* of *Oyster-Shells*.
 Ph. Col. n. 7. p. 188.
17. The *Texture* of the *Muscular Flesh* of *Lobsters* and *Prawns*.
 n. 145. p. 74.
18. The *Generation* of *Animals ab Animalculo* and not *ex Ovo*; The *Parts* and *Generation* of *Fleas*; The *Flesh* of a *Lowse*; The *Flesh* and *Feathers* of a *Gnat*; *Sal Volatile Oleosum* mixt with *Blood*; No *Air-Bubbles* in *Blood*.
 n. 148. p. 197.
19. The *Texture* of several sorts of *Trees*, and their *Five* sorts of *Vessels*; *Animalcles* in the *Melts* of *Fish*.
 n. 152. p. 347.
20. The *Generation* of *Animals ab Animalculo in Semine Masculo*, particularly of *Frogs* and *Fish*; The *Vessels* and *Muscles* of a *Frog*; *Digestion* by the *Motion* of the *Stomach*; *Circulation* of the *Blood*; and the *Cause* of *Fevers*.
 n. 159. p. 568.
21. *Animalcles* in *Spittle*; in the *Scurf* of the *Teeth*; the *Supposed Worms* in the *Skin*; and the *Scales* upon the *Skin*.
 n. 197. p. 646.
22. The *Cuticula* of the *Mouth* and *Lips* covered with *Scales*; The *reason* of the *Tickling* by a *Hair* lying upon the *Skin*; A *Scaly Child*; the *Slime* within the *Guts*; the *Lacteal* and *Lymphatick Vessels*; and the *Use* of the *Slime* within the *Guts*.
 n. 160. p. 586.
23. The *Crystalline Humour* of the *Eye*; the *Use* of the *Eye-Lids*; and the *Red Particles* of *Blood*.
 n. 165. p. 780.
24. The *Brain* of several *Animals*; the *Crystalline Humour* of an *Humane Eye*; *Moxa*, and other *Downy Substances*; the *Chalk-Stones* of the *Gout*; the *Leprosy*; and the *Scales* of *Eels*.
 n. 168. p. 88.

25. The Salts of Vinegar; Crabs-Eyes and Chalk Dissolv'd in Vinegar; The Particles of Water; the Salts of several Sorts of Wine; Tartar, Crabs-Eyes and Chalk dissolv'd in Wine. n. 170. p. 983.
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F I N I S.

